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THIRTIETH ANNUAL REPORT
OF THE
HEALTH DEPARTMENT



OF THE
CITY OF BOSTON
1901

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THIRTIETH ANNUAL REPORT

OF THE

HEALTH DEPARTMENT

117559

OF THE

CITY OF BOSTON

FOR THE YEAR 1901



BOSTON
MUNICIPAL PRINTING OFFICE
1902

ORGANIZATION OF THE HEALTH DEPARTMENT.

SAMUEL H. DURGIN, *Chairman.*

EDWIN L. PILSBURY.

ROBERT COX.

CHARLES E. DAVIS, JR., *Secretary.*

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HEALTH DEPARTMENT,

BOSTON, February, 1, 1902.

HON. PATRICK A. COLLINS,

Mayor of the City of Boston :

SIR, — The Board of Health respectfully submits its thirtieth annual report of the doings of the Health Department for the past year.

The total number of deaths for the year was 11,300, a decrease from the previous year of 378 deaths. The population, estimated in the middle of the year, is 573,579. The death-rate for the year, as calculated on this population, is 19.70 per 1,000 inhabitants. This rate is less by 1.12 than that of the previous year, and the lowest on record. There were 3,494 * deaths from zymotic diseases, including consumption, a decrease of deaths from the same group of the previous year. There were 184 less deaths from diphtheria and croup than in 1900, with a proportionate decrease in the number of cases. The percentage of deaths to the number of cases of diphtheria reported was 10.63, as against 10.79 per cent. the preceding year. There were 210 deaths from scarlatina, 29 more deaths than in the preceding year, and higher than the average of the five previous years. Typhoid fever has caused 142 deaths during the year, 1 less death than the preceding year. Sixty-one of the deaths from this cause occurred during the months of

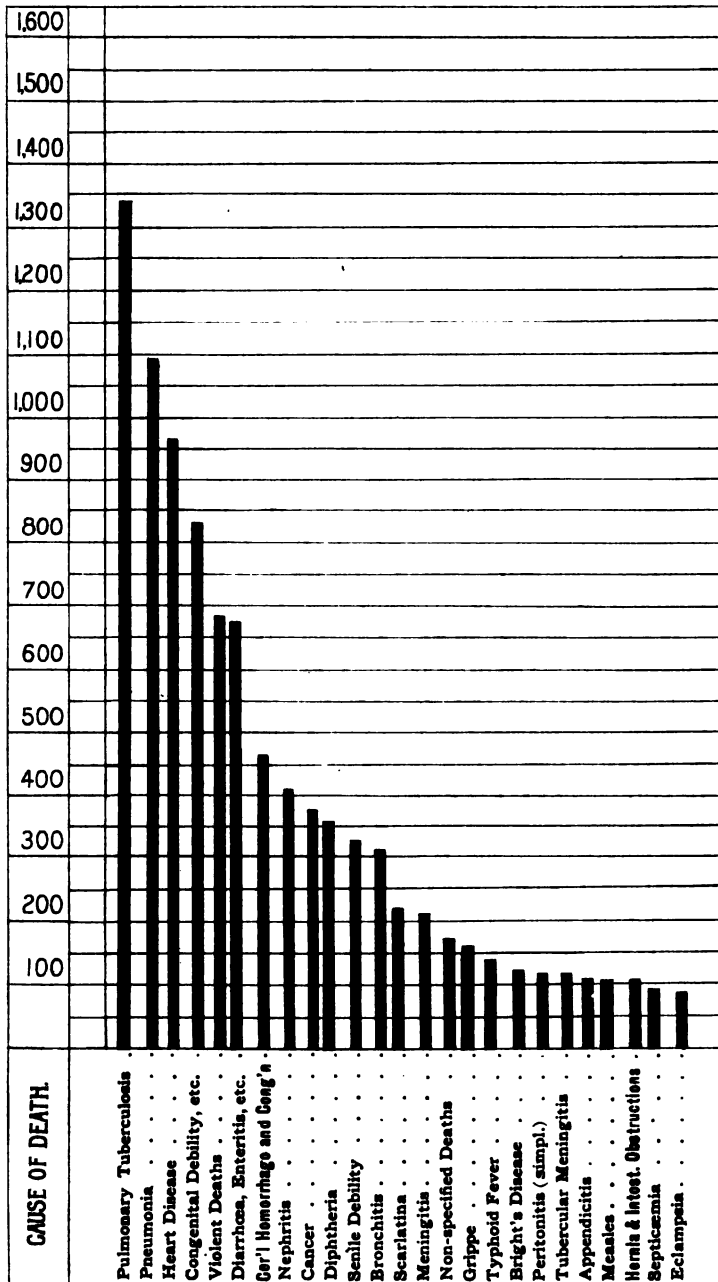
* The increased number of deaths in the zymotic group in 1900 and 1901 over that of 1899 and previously is chiefly due to the incorporating into this group, pulmonary, laryngeal, and general tuberculosis, with some forms of diarrhoeal diseases.

August, September and October, and 95 of the whole number died between the ages of 20 and 40 years.

There were 103 deaths from measles during the year. The number of deaths of children under five years of age was 3,469, compared with 3,752 for the previous year, showing a decrease of 283 deaths. The respiratory diseases are still the most fatal, causing fully 25 per cent. of the whole mortality the past year, as against 26 per cent. in 1900.

CHART NO. 1.

Comparative View of Twenty-five of the Principal Causes of Death during the Year 1901.

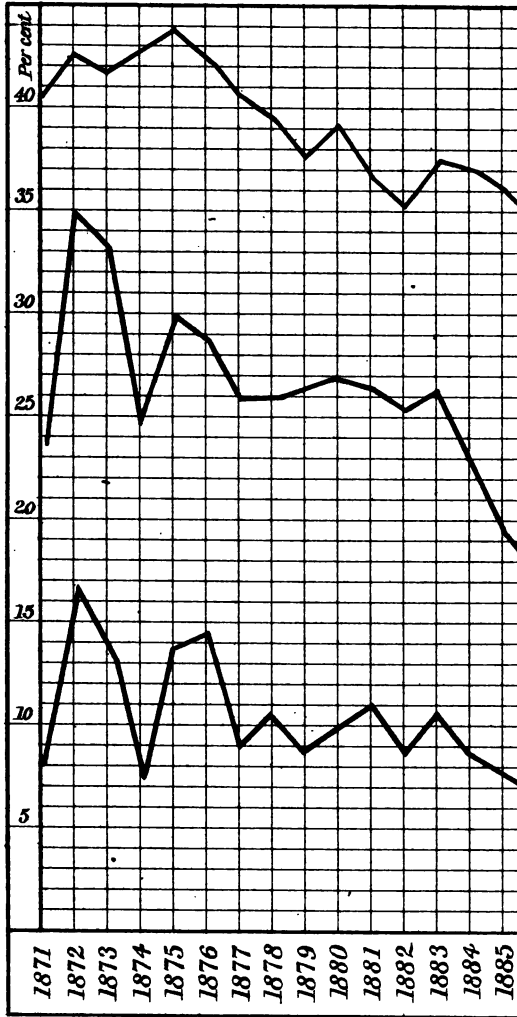


■ Deaths from Zymotic Diseases.

■ Deaths from other Diseases.

CHART

Percentage of Deaths of Chil
ZYMOTIC DEATHS, AND FIVE OF T.
to the total mortality for this

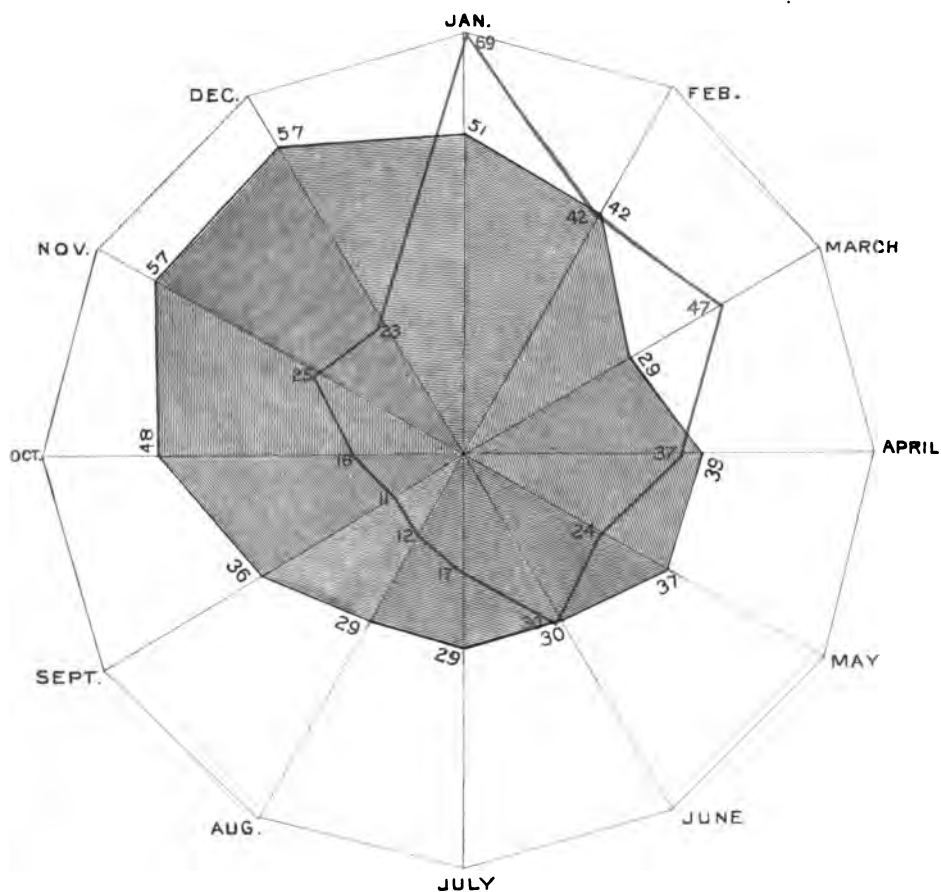


Percentage of Children under five
" of Zymotic deaths to
" of Diphtheria, Scarlet
and Small-Pox to the

The increased number of deaths in the Z
chiefly due to the incorporating into this gr
culosis, with some forms of Diarrheal Disease

CHART NO. 4.

DIPHThERIA AND CROUP.



———— Average deaths per month for ten years, 1892-1901.

———— Deaths per month for the year 1901.

Table 1.—Total of Deaths, Still-births and Deaths from Zymotic Diseases for Thirty-one Years, with Percentages.

YEARS.	Total Deaths, exclusive of still-births.	Still-births.	Total Zymotic Deaths.	Diphtheria and Group.	Scarlet Fever.	Typhoid Fever.	Cerebro-spinal Meningitis.	Whooping Cough.	Measles.	Diarrhoeal Diseases.	Small-pox.	Percentage of Zymotic Deaths to to- tal Mortality.	Rates of Still- births per 1,000 Inhabi- tants.
1871.....	5,888	543	1,408	128	111	176	3	30	9	756	23	23.91	1.88
1872.....	8,090	566	2,823	94	258	229	60	52	60	1,006	738	34.89	1.91
1873.....	7,869	515	2,626	119	474	243	216	33	16	925	302	33.37	1.76
1874.....	7,812	642	1,899	121	269	202	35	108	41	940	2	24.30	2.19
1875.....	9,060	541	2,722	681	534	227	41	41	65	989	1	30.02	1.28
1876.....	8,253	485	2,439	720	458	145	13	59	2	827	2	29.55	1.41
1877.....	7,816	471	1,890	471	104	156	24	88	2	913	4	25.83	1.37
1878.....	7,636	441	1,980	569	68	120	19	88	145	816	....	25.91	1.28
1879.....	7,398	453	1,935	545	149	119	15	112	2	772	....	26.15	1.24
1880.....	8,531	443	2,321	774	33	154	8	94	49	1,003	1	27.20	1.22
1881.....	9,016	513	2,423	802	35	207	16	77	108	870	6	26.87	1.29
1882.....	8,995	518	2,276	575	75	212	24	92	25	951	8	25.30	1.26
1883.....	9,740	504	2,551	608	211	198	23	31	152	1,023	1	26.19	1.17
1884.....	9,622	503	2,278	487	209	216	26	181	13	855	1	23.67	1.17
1885.....	9,618	520	1,879	450	156	152	19	26	84	723	2	19.53	1.30
1886.....	9,268	543	1,644	423	81	135	14	37	36	705	....	17.73	1.35
1887.....	10,073	534	1,968	410	195	183	16	82	119	734	....	19.70	1.33
1888.....	10,197	552	1,841	589	65	170	19	74	27	669	2	18.05	1.33
1889.....	10,259	598	1,968	683	23	186	21	96	48	710	2	19.18	1.42
1890.....	10,181	627	1,677	462	42	155	17	39	19	665	....	16.47	1.39
1891.....	10,571	614	1,615	285	64	154	21	39	21	755	....	15.27	1.33
1892.....	11,236	633	2,014	481	262	137	12	45	19	693	....	17.92	1.34
1893.....	11,710	605	2,042	546	248	148	15	40	27	635	....	17.43	1.24
1894.....	11,520	700	2,357	878	192	141	18	111	8	700	22	20.46	1.39
1895.....	11,329	607	1,968	654	114	163	15	47	19	627	....	17.37	1.21
1896.....	11,634	648	1,985	572	112	162	21	67	27	713	....	17.06	1.25
1897.....	11,154	614	1,806	456	136	173	185	39	21	522	....	16.19	1.16
1898.....	10,886	613	1,470	185	38	185	47	68	27	599	....	13.50	1.18
1899.....	11,167	539	1,444	304	74	165	88	76	33	396	5	12.98	.97
1900.....	11,678	573	3,787	537	181	143	66	99	89	*740	...	32.43	1.02
1901.....	11,300	576	3,494	353	210	142	54	65	103	728	74	30.92	1.00

* The increase of diarrhoeal diseases in the years 1900 and 1901 is due to the including in this group enteritis, gastro-enteritis, etc.

Table II. — Total Number of Deaths under Five Years, and Five Years and over, for Thirty-one Years, with Percentages to the Total Mortality.

YEARS.	Total Deaths.	Five Years and over.	Under Five Years.	PERCENTAGES.	
				Five Years and over.	Under Five Years.
1871.....	5,888	3,493	2,395	59.33	40.67
1872.....	8,090	4,676	3,414	57.79	42.21
1873.....	7,869	4,580	3,289	58.20	41.80
1874.....	7,812	4,454	3,358	57.01	42.99
1875.....	9,060	5,068	3,972	56.16	43.84
1876.....	8,253	4,722	3,531	57.22	42.78
1877.....	7,316	4,334	2,982	59.24	40.76
1878.....	7,636	4,630	3,006	60.63	39.37
1879.....	7,398	4,568	2,806	62.08	37.92
1880.....	8,531	5,182	3,349	60.74	39.26
1881.....	9,016	5,702	3,314	63.24	36.76
1882.....	8,995	5,844	3,151	64.97	35.03
1883.....	9,740	6,113	3,673	62.76	37.24
1884.....	9,622	6,032	3,570	62.90	37.10
1885.....	9,618	6,152	3,466	63.97	36.03
1886.....	9,268	6,082	3,186	65.63	34.37
1887.....	10,073	6,411	3,662	63.55	36.35
1888.....	10,197	6,598	3,599	64.71	35.29
1889.....	10,259	6,626	3,633	64.59	35.41
1890.....	10,181	6,882	3,349	67.11	32.89
1891.....	10,571	6,963	3,608	65.87	34.13
1892.....	11,236	7,501	3,735	66.76	33.24
1893.....	11,710	7,723	3,987	65.96	34.04
1894.....	11,520	7,412	4,108	64.34	35.66
1895.....	11,329	7,394	3,935	65.27	34.73
1896.....	11,634	7,579	4,055	65.15	34.85
1897.....	11,154	7,446	3,708	66.76	33.24
1898.....	10,886	7,309	3,577	67.14	32.86
1899.....	11,167	7,576	3,591	67.84	32.16
1900.....	11,678	7,926	3,752	67.87	32.13
1901.....	11,300	7,831	3,469	69.30	30.70

Table III.—Deaths during the Year 1901, by Sex, Condition, Color, Nativity, Percentage, and Season.

	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.
Total number of deaths,	1,077	929	1,026	1,002	929	818	894	989	981	878	929	908	11,800
<i>Sex:</i>													
Males.....	583	477	587	526	483	432	455	505	478	453	473	493	5,895
Females.....	494	452	439	476	446	381	439	484	453	425	456	410	5,405
<i>Condition:</i>													
Single.....	546	460	478	535	455	420	503	639	545	468	460	430	5,939
Married.....	343	299	343	290	304	273	250	229	241	260	291	309	3,441
Widows.....	126	109	123	98	105	80	98	78	85	108	118	106	1,324
Widowers.....	57	56	73	58	57	35	41	33	48	42	51	42	593
Divorced.....	2	1	5	5	3	1	3	1	5	3	2	4	35
Unknown.....	3	4	4	7	5	4	4	9	7	2	7	12	68
<i>Color:</i>													
White.....	1,050	895	999	971	900	787	874	969	901	855	910	870	10,981
Black (Negro or Mixed)	25	33	25	27	26	24	16	15	29	21	18	33	292
Indian.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	1
Chinese.....	2	1	1	4	3	2	4	5	1	2	1	...	26
<i>Nativity:</i>													
United States.....	671	597	644	649	613	518	582	725	648	573	570	553	7,343
Ireland.....	207	165	192	161	167	148	159	123	135	159	189	174	1,979
England.....	31	22	20	26	15	15	8	17	32	11	14	13	214
Scotland.....	7	10	8	5	6	7	14	5	9	7	7	8	93
Germany.....	17	14	27	16	21	9	14	10	12	13	21	19	193
Br. Provinces.....	72	71	66	82	59	62	56	46	44	55	72	71	756
Italy.....	19	17	25	16	9	18	14	14	14	14	13	21	194
Russia.....	10	12	12	17	11	9	9	9	6	12	7	12	126
Sweden.....	7	2	5	5	7	8	8	7	7	8	8	5	77
Other countries.....	27	13	16	13	9	9	20	16	18	15	16	14	186
Unknown.....	9	6	11	12	12	10	10	17	16	11	12	13	139
<i>Parentage:</i>													
American.....	281	227	248	232	242	196	176	234	229	198	195	222	2,680
Irish.....	350	291	321	289	284	266	292	263	268	286	327	282	3,519
English.....	24	17	19	20	20	19	13	16	17	13	20	15	213
Scotch.....	13	8	13	6	9	15	13	10	12	13	9	12	133
German.....	22	16	31	25	27	16	21	22	20	20	27	30	277
Br. Provinces.....	56	65	60	73	43	54	49	54	65	44	53	53	672
Italian.....	34	37	32	45	35	40	32	46	41	45	31	35	453
Russian.....	20	24	27	40	17	27	29	34	21	27	17	25	308
Swedish.....	10	1	10	8	11	9	9	17	11	11	10	7	114
Other countries.....	77	58	59	64	47	39	52	76	61	45	38	22	638
Mixed.....	69	66	80	86	79	59	84	98	81	70	88	97	957
One parent unknown..	49	41	52	42	53	24	63	58	39	53	38	32	544
Unknown.....	72	78	74	72	62	49	61	61	63	53	76	71	792

Table IV. — Monthly Deaths Reduced to a Standard of 100.

MONTHS. 1901.	Total Deaths in Month.	Monthly Deaths Reduced to a Standard of 100.	Deaths per Day.
January.....	1,077	112.3	34.7
February.....	929	107.2	33.2
March.....	1,026	107.0	33.1
April.....	1,002	107.9	33.4
May.....	929	96.9	30.0
June.....	813	87.6	27.1
July.....	894	93.2	28.8
August.....	969	103.1	31.9
September.....	831	100.3	31.0
October.....	878	91.5	28.3
November.....	929	100.1	30.9
December.....	908	94.1	29.1
	11,800	100.0	30.9

Table V. — Deaths from Principal Zymotic Diseases.

	Total Deaths from each Cause.	Percentage of each Cause to Total Mortality.	Death per 1,000 In- habitants.	Total Deaths per Sex.		Total Deaths per Sex under Five Years.		Total Deaths under Five Years.	Percentage of each Cause under Five Years to Total Mortality.
				M.	F.	M.	F.		
Small-pox.....	74	.655	.129	44	30	4	7	11	.097
Measles.....	108	.911	.179	62	41	59	40	99	.876
Scarlatina.....	210	1.858	.366	123	87	79	52	131	1.159
Diphtheria and Croup.....	353	3.124	.615	198	160	137	98	235	2.079
Whooping-cough.....	65	.575	.113	27	38	27	38	65	.575
Typhoid fever.....	142	1.257	.247	84	58	1	2	3	.027
Erysipelas.....	51	.451	.089	32	19	8	6	14	.124
Puerperal fever.....	31	.274	.054	.....	31	.....	.....	.....	.....
Dysentery.....	28	.248	.049	14	14	7	5	12	.108
Cholera morbus.....	4	.035	.007	3	1	1	.....	1	.009
Diarrhœa, including Cholera infantum.....	696	6.159	1.213	340	356	324	310	634	5.610
Phthisis Laryngeal and Pulmonary.....	1,846	11.985	2.346	733	613	33	32	65	.575
Influenza.....	166	1.469	.289	71	95	12	7	19	.168
Intermittent fever.....	1	.009	.002	1	.....	.....	.....	.....	.....
Rheumatism.....	35	.309	.061	15	20	1	.....	1	.009
Syphilis, congenital.....	22	.194	.038	10	12	10	12	22	.194
Syphilis, tertiary.....	13	.115	.023	3	10	.....	.....	.....	.....
Pyemia and Septicemia...	98	.867	.170	50	48	9	12	21	.186
Typhus fever.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Remittent fever.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Yellow fever.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

Table VI. — Yearly Percentages of Principal Zymotic Deaths from 1879 to 1901, inclusive, to Total Mortality.

	1879.	1880.	1881.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.	1890.	1891.	1892.	1893.	1894.	1895.	1896.	1897.	1898.	1899.	1900.	1901.
Small-pox .....	.....	011	066	088	010	010	020	.....	.....	019	019	.....	.....	.....	084	190	.....	.....	188	.....	045	.....	655
Measles	027	574	1197	277	1560	135	873	888	1181	964	468	186	198	169	280	069	187	264	188	248	595	753	911
Scarlatina	2014	896	388	833	2168	179	1621	873	1835	637	294	419	605	2331	2118	1666	1006	1040	1319	308	662	1549	1858
Diphtheria	5285	6892	6665	5091	4568	3585	3479	3519	3187	4609	5468	3938	2194	3684	4064	7092	5190	4435	8684	1562	480	4598	8124
Croup	9081	2180	2280	1300	1673	1475	1900	1014	833	1167	1160	690	501	506	597	923	582	431	409	188	289	.....	.....
Whooping-cough	1518	1101	854	1023	318	1881	1970	399	814	1755	986	833	368	400	341	983	414	578	349	625	680	648	575
Erysipelas	1608	1104	2905	2368	2082	2945	1580	1458	1816	1667	1818	1332	1486	1219	1293	1223	1438	1792	1551	1690	1477	1324	1257
Typhoid fever	627	984	2465	444	431	448	415	490	837	402	924	332	1868	329	473	277	300	388	297	276	876	454	451
Fuerrera fever	851	726	754	833	728	467	907	183	228	176	117	958	1019	908	108	188	128	172	117	078	098	248	274
Carbuncle .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Dysentery	1385	1088	1044	922	908	683	644	658	585	470	741	904	454	268	333	329	379	378	161	377	277	081	248
Diarrhoea	2387	2006	2006	2568	2731	2936	1767	1805	1578	1510	1580	1119	851	685	700	607	609	559	790	937	618	6327	6169
Cholera morbus	351	445	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Cholera infantum	5117	6171	4197	5625	5574	5772	4708	4700	4804	4348	4368	4301	5647	5010	4261	4183	4113	4942	8586	4081	2507	.....	.....
Cerebro-spinal fever	202	106	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Enteric fever .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Remittent fever .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Rheumatism .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Erysipelas .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Syphilis, congenital .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Syphilis, tertiary .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Furunculæ .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Alcoholism .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Septicæmia .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Fellow fever .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Tonsillitis .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

* Alcoholism is now excluded from list of zymotics.

Table VII.—The Number and Percentages of Deaths in each Quarter of each Year during a Period of Thirty-seven Years, 1865-1901 Inclusive.

YEARS.	FIRST QUARTER.		SECOND QUARTER.		THIRD QUARTER.		FOURTH QUARTER.		Rate per 1,000 Inhabitants. ¹
	Deaths.	Per cent.	Deaths.	Per cent.	Deaths.	Per cent.	Deaths.	Per cent.	
1865	1,115	24.55	1,068	23.02	1,353	29.80	1,005	22.13	23.61
1866	989	22.81	967	21.85	1,336	30.56	1,065	24.78	22.51
1867	1,071	24.22	960	21.49	1,191	26.94	1,309	27.35	23.38
1868	1,341	24.30	1,303	21.80	1,736	31.45	1,339	22.45	23.89
1869	1,374	24.88	1,397	23.48	1,562	28.28	1,390	23.36	23.54
1870	1,395	23.83	1,314	21.55	1,983	32.53	1,406	23.05	24.34
1871	1,411	23.97	1,399	22.06	1,842	31.28	1,398	22.69	23.82
1872	1,697	20.97	1,777	21.97	2,511	31.04	2,105	26.02	30.43
1873	2,115	26.88	1,726	21.93	2,278	28.95	1,760	22.24	28.75
1874	1,805	23.11	1,818	23.27	2,278	29.16	1,911	24.46	23.57
1875	2,190	24.17	2,011	22.20	2,680	29.53	2,179	24.05	26.50
1876	2,246	27.21	1,809	21.92	2,375	28.78	1,833	22.09	30.96
1877	1,723	23.55	1,613	22.05	2,317	31.67	1,663	22.73	30.89
1878	1,743	22.82	1,744	22.84	2,174	28.47	1,975	25.87	21.55
1879	1,947	26.32	1,615	21.83	1,969	26.48	1,877	25.37	20.63
1880	2,015	23.62	1,829	21.45	2,500	29.30	2,187	25.63	23.51

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1891	2,332	25.88	2,091	22.43	2,466	27.35	2,197	24.38	24.48
1892	2,104	23.89	2,212	24.50	2,439	27.67	2,190	24.35	24.07
1893	2,268	23.28	2,409	24.74	2,757	28.31	2,806	23.67	25.69
1894	2,284	23.73	2,103	21.85	2,725	28.33	2,510	26.09	25.01
1895	2,510	26.10	2,484	25.82	2,692	26.95	2,092	21.13	24.64
1896	2,214	23.89	2,113	22.79	2,680	27.84	2,861	25.48	23.09
1897	2,362	23.45	2,281	22.65	2,912	28.90	2,518	25.00	21.41
1898	2,790	27.36	2,430	23.73	2,649	25.98	2,338	22.93	24.03
1899	2,437	23.75	2,543	24.79	2,854	27.82	2,435	23.64	23.52
1890	2,911	23.60	2,244	22.04	2,699	26.51	2,327	22.85	22.70
1891	2,442	23.10	2,540	24.03	2,835	26.82	2,764	26.05	23.09
1892	2,998	26.68	2,593	22.98	2,958	26.33	2,698	24.01	24.04
1893	2,969	26.35	2,847	24.31	3,013	25.74	2,681	24.60	24.55
1894	2,972	25.80	2,592	22.50	3,182	27.62	2,774	24.08	23.66
1895	2,995	26.44	2,574	22.72	3,027	26.72	2,793	24.12	22.60
1896	2,897	24.90	2,807	24.13	3,319	28.53	2,611	22.44	22.53
1897	3,022	27.09	2,892	25.12	2,833	25.40	2,497	22.89	21.08
1898	2,599	23.87	2,513	23.08	3,051	28.08	2,724	25.02	20.09
1899	2,867	26.75	2,692	23.57	2,800	25.07	2,748	24.61	20.12
1900	3,368	28.84	2,778	23.79	2,906	24.89	2,696	22.48	20.82
1901	3,032	26.83	2,744	24.29	2,814	24.90	2,710	23.98	19.70

1 Population estimated in non-census years on Dr. Farr's formula.

Table VIII.—Deaths from Ten of the Principal Causes.

	Total Deaths from each Cause.	Percentage of each Cause to Total Mortality.	Death per 1,000 Inhabitants.	Total Deaths by Sex.		Total Deaths by Sex under Five Years.		Total Deaths under Five Years.	Percentage of each Cause under Five Years to Total Mortality.
				M.	F.	M.	F.		
Pulmonary and Laryngeal tuberculosis.....	1,846	11.985	2,346	733	613	33	32	65	.575
Pneumonia.....	1,099	9.735	1,916	602	497	247	196	443	3.920
Heart disease.....	963	8.522	1,679	479	484	15	8	23	.204
Congenital debility, scleremia, etc.....	834	7.380	1,454	487	347	487	347	834	7.380
Diarrhoea, enteritis, etc.....	728	6.442	1,269	357	371	322	315	637	5.687
Violent deaths.....	671	5.938	1,170	487	184	51	32	83	.734
Cerebral Hemorrhage and Congestion.....	460	4.070	.802	205	255	4	8	12	.106
Cancer and other malignant tumors,	455	4.027	.793	147	308	1	1	1	.009
Nephritis.....	405	3.584	.706	222	183	12	12	24	.212
Diphtheria and Croup.....	353	3.124	.615	193	160	137	96	235	2.079

Table IX.—Total Deaths each Quarter of the last Five Years, with the Aggregate and Average Number from 1892 to 1896, Inclusive.

	1897.	1898.	1899.	1900.	1901.	5 years, 1892-1896.	
						Aggregate.	Average.
First quarter.....	3,022	2,599	2,987	3,368	3,032	14,831	2,966
Second quarter.....	2,802	2,512	2,632	2,778	2,744	13,402	2,680
Third quarter.....	2,833	3,051	2,800	2,906	2,814	15,499	3,100
Fourth quarter.....	2,497	2,724	2,748	2,626	2,710	13,697	2,739
Total each year.	11,154	10,886	11,167	11,678	11,300	57,429	11,485

Table X. — Total Deaths and Percentages each Quarter for the Year 1901, with Aggregates and Percentages for the Ten Years Previous.

	1901.		1891-1900.	
	Deaths.	Per cent.	Deaths.	Per cent.
First quarter	8,082	26.83	29,249	25.91
Second quarter	2,744	24.29	26,666	23.68
Third quarter	2,814	24.90	29,924	26.50
Fourth quarter	2,710	23.98	27,046	23.96
Total	11,300	100.00	112,885	100.00

Table XI.—Percentage of Children under One, Two, and Five Years for each Month during Year 1901.

	JANUARY.			FEBRUARY.			MARCH.			APRIL.			MAY.			JUNE.		
	Under 1 yr.	1 yr. and under 2 yrs.	2 yrs. and under 5 yrs.	Under 1 yr.	1 yr. and under 2 yrs.	2 yrs. and under 5 yrs.	Under 1 yr.	1 yr. and under 2 yrs.	2 yrs. and under 5 yrs.	Under 1 yr.	1 yr. and under 2 yrs.	2 yrs. and under 5 yrs.	Under 1 yr.	1 yr. and under 2 yrs.	2 yrs. and under 5 yrs.	Under 1 yr.	1 yr. and under 2 yrs.	2 yrs. and under 5 yrs.
United States.....	56	13	25	45	11	22	47	8	22	37	10	11	40	13	18	34	8	9
Foreign.....	69	31	29	59	29	24	66	27	35	55	39	37	59	26	20	76	26	30
Mixed.....	18	6	9	27	5	8	30	3	8	27	13	14	30	4	9	24	5	12
One parent known.....	16	4	2	11	4	1	17	4	.....	15	1	2	16	7	1	8	2	.....
Unknown.....	5	1	.....	4	1	.....	1	1	1	2	2	6	4	.....	1	4	.....	1
Total.....	164	55	65	146	50	55	161	43	66	166	65	70	149	50	49	146	41	52

	JULY.			AUGUST.			SEPTEMBER.			OCTOBER.			NOVEMBER.			DECEMBER.		
	Under 1 yr.	1 yr. and under 2 yrs.	2 yrs. and under 5 yrs.	Under 1 yr.	1 yr. and under 2 yrs.	2 yrs. and under 5 yrs.	Under 1 yr.	1 yr. and under 2 yrs.	2 yrs. and under 5 yrs.	Under 1 yr.	1 yr. and under 2 yrs.	2 yrs. and under 5 yrs.	Under 1 yr.	1 yr. and under 2 yrs.	2 yrs. and under 5 yrs.	Under 1 yr.	1 yr. and under 2 yrs.	2 yrs. and under 5 yrs.
United States.....	44	10	9	36	18	8	84	13	7	46	10	11	32	5	14	29	6	19
Foreign.....	109	32	23	161	21	31	131	32	17	91	21	19	70	17	28	63	23	19
Mixed.....	35	6	9	59	8	5	44	5	5	29	4	3	33	6	8	33	14	11
One parent known.....	28	2	.....	33	1	1	18	1	1	22	1	1	14	5	3	10	1	.....
Unknown.....	6	.....	1	12	.....	1	6	.....	.....	10	.....	1	4	3	.....	2	.....	1
Total.....	222	50	42	363	43	46	283	51	30	196	36	35	159	36	53	137	44	50

Table XII.—Cases Reported, and Deaths from Small-pox, Diphtheria, Scarlet Fever, and Typhoid Fever, with Percentages.

DATE.	SMALL-POX.		Percentages.	DIPHTHERIA AND CROUP.		Percentages.	SCARLET FEVER.		Percentages.	TYPHOID FEVER.		Percentages.
	Cases.	Deaths.		Cases.	Deaths.		Cases.	Deaths.		Cases.	Deaths.	
1872	2,592	738	28.4	1,370	569	41.53	1,334	104	7.7	335	76	22.8
1873	1,108	302	27.3	1,167	545	46.70	948	68	8.0	897	212	23.3
1874	7	3	28.5				931	149	16.3	898	212	23.3
1875	5	1	20.0				1,408	75	5.3	948	198	20.8
1876	6	2	33.33				2,638	269	10.2	767	152	19.5
1877	17	4	23.5				1,665	156	9.3	814	135	16.5
1878							1,149	81	7.0	940	183	19.46
1879							1,549	195	12.58	924	170	18.39
1880	4	1	25.0				1,707	65	3.8	1,071	186	17.37
1881	44	6	13.6	1,715	774	45.13	1,494	43	2.9	947	135	14.29
1882	24	8	33.3	1,696	802	47.74	924	64	6.8	966	154	15.84
1883	8	1	12.4	1,386	575	41.53	2,639	262	9.9	795	187	23.5
1884	1	1	100.0	1,415	698	49.37	2,639	262	9.9	824	149	18.08
1885	11	1	9.0	1,212	487	40.18	2,639	192	7.3	915	141	15.41
1886	1	1		1,283	450	35.03	1,612	114	7.07	1,028	163	15.83
1887	1	1		1,198	423	35.30	1,312	131	9.9	1,076	162	15.08
1888	1	1		1,040	410	39.08	1,312	131	9.9	1,076	162	15.08
1889	5	1	20.0	1,411	638	45.21	1,385	186	13.4	969	172	17.65
1890	10	2	20.0	1,411	638	45.21	1,385	186	13.4	969	172	17.65
1891	1	1		1,475	462	31.32	1,385	186	13.4	969	172	17.65
1892				1,831	386	21.08	1,385	186	13.4	969	172	17.65
1893	96	4	4.17	1,831	431	23.5	2,639	262	9.9	824	149	18.08
1894	77	22	28.5	3,019	875	29.07	2,639	192	7.3	915	141	15.41
1895				4,068	654	16.1	1,312	131	9.9	1,028	163	15.83
1896				3,688	572	15.5	1,312	131	9.9	1,028	163	15.83
1897	10			3,688	136	3.68	1,385	186	13.4	969	172	17.65
1898				3,688	136	3.68	1,385	186	13.4	969	172	17.65
1899	29	5	17.24	2,895	304	10.5	1,385	186	13.4	969	172	17.65
1900	7			4,977	337	6.75	1,385	186	13.4	969	172	17.65
1901	504	74	14.68	3,519	308	8.75	1,385	210	15.2	713	141	19.77

* Including one case and one death at quarantine.

Table XV.

COMPARATIVE DEATHS IN AMERICAN AND FOREIGN CITIES.

The following tables have been prepared to show the comparison of deaths in a few large American and foreign cities, as compared with the City of Boston. It is to be regretted that the amount of information desired is not fully complete, owing to the scarcity of material and information furnished, but in their present condition, as a matter of reference, they may be of value:

Boston.

YEARS.	Population.	Total Deaths.	Population of Children under 5 years of age. ¹	Deaths of Children under 5 years of age.	Deaths from Diphtheria.	Deaths from Scarlatina.	Deaths from Typhoid Fever.	Deaths from Measles.
1880.....	362,839	8,581	29,649	3,349	588	33	154	49
1881.....	368,190	9,016	30,809	3,314	601	35	207	108
1882.....	373,623	8,965	31,969	3,151	458	75	212	25
1883.....	379,129	9,740	33,129	3,627	445	211	198	152
1884.....	384,720	9,622	34,289	3,570	345	209	216	18
1885.....	390,396	9,618	35,449	3,466	334	156	152	84
1886.....	401,374	9,268	36,582	3,186	329	81	135	36
1887.....	412,663	10,073	37,717	3,662	316	195	133	119
1888.....	424,274	10,197	38,849	3,509	470	65	170	27
1889.....	436,208	10,259	39,963	3,633	564	23	186	48
1890.....	448,477	10,181	41,117	3,349	401	42	155	19
1891.....	457,772	10,571	42,251	3,608	232	64	154	21
1892.....	467,260	11,236	43,383	3,735	414	262	137	19
1893.....	476,945	11,710	44,518	3,967	476	248	148	27
1894.....	486,880	11,520	45,654	4,108	817	192	141	8
1895.....	501,083	11,329	46,787	3,935	588	114	163	19
1896.....	516,305	11,634	47,920	4,055	516	121	162	27
1897.....	528,912	11,154	49,053	3,708	411	136	173	21
1898.....	541,827	10,886	50,185	3,577	170	33	185	27
1899.....	555,057	11,167	51,317	3,591	277	74	165	38
1900.....	560,892	11,678	52,449	3,752	* 537	181	143	88
1901.....	573,579	11,300	53,581	3,469	* 353	210	142	103

¹ Corrected by census years. ² Including group.

Table XVI. — Philadelphia, Pa.

YEARS.	Population.	Total Deaths.	Population of Children under 5 years of age.	Deaths of Children under 5 years of age.	Deaths from Diphtheria.	Deaths from Scarlatina.	Deaths from Typhoid Fever.	Deaths from Measles.
1880 ¹	846,980	17,711	¹ 91,544	6,594	323	291	498	108
1881	868,000	19,515	² 92,744	7,124	457	486	645	17
1882	886,539	20,059	94,044	7,254	933	310	650	91
1883	907,041	20,076	95,234	7,417	1,006	561	579	58
1884	927,995	19,999	96,465	7,606	680	540	662	96
1885	949,432	21,392	97,965	8,188	600	375	610	131
1886	971,363	20,005	98,925	7,351	411	248	618	19
1887	993,801	21,719	100,155	8,421	416	159	621	353
1888	1,016,758	20,372	101,386	7,269	350	235	785	24
1889	1,040,245	20,536	102,616	7,752	375	298	736	92
1890 ¹	1,046,964	21,732	¹ 103,847	7,913	528	189	666	105
1891	1,069,264	23,367	105,077	8,479	918	341	684	25
1892	1,092,168	24,305	.....	9,305	1,425	484	539	74
1893	1,115,562	23,655	.....	8,690	892	267	456	83
1894	1,139,457	22,680	.....	8,160	1,047	154	369	33
1895	1,163,864	23,797	.....	8,401	1,020	79	469	84
1896	1,188,793	23,962	.....	8,661	862	61	402	191
1897	1,214,256	22,735	.....	7,605	1,231	282	401	64
1898	1,240,266	23,790	.....	7,998	998	114	² 639	234
1899	1,266,832	23,796	.....	7,056	849	132	948	7
1900	1,293,697	25,078	.....	8,078	896	163	449	382
1901	1,321,408	24,137	.....	6,840	525	219	444	26

¹ Census years.² Estimated on the increase of census years.³ Seventy-three of these were soldiers who contracted the disease in camps.

Table XVII.
(Old City of) New York, N. Y.

YEARS.	Population.	Total Deaths.	Population of Children under 5 years of age. ¹	Deaths of Children under 5 years of age.	Deaths from Diphtheria.	Deaths from Scarlatina.	Deaths from Typhoid Fever.	Deaths from Measles.
1880 ¹	1,309,268	81,987	140,673	14,650	1,890	618	372	479
1881.....	1,246,011	88,624	144,947	17,737	2,249	1,964	594	429
1882.....	1,238,870	87,924	149,351	17,520	1,525	2,066	516	913
1883.....	1,322,880	84,011	153,889	13,856	1,009	744	625	716
1884.....	1,363,075	85,044	158,665	15,272	1,090	608	476	762
1885.....	1,404,401	85,682	163,383	15,267	1,325	559	405	736
1886.....	1,447,166	87,351	168,347	16,121	1,727	371	433	668
1887.....	1,491,137	88,933	173,462	16,766	2,167	569	421	767
1888.....	1,536,444	40,175	178,733	17,358	1,914	1,361	364	591
1889.....	1,583,120	39,679	184,164	17,152	1,686	1,242	397	470
1890.....	1,631,232	40,103	189,760	16,305	1,262	408	352	730
1891.....	1,680,796	43,659	195,525	13,224	1,361	1,220	384	663
1892.....	1,627,396	44,317	.....	18,589	1,425	975	399	863
1893.....	1,691,306	44,479	.....	17,914	1,968	552	381	390
1894.....	1,957,452	41,175	.....	17,596	2,359	541	326	584
1895.....	1,879,195	43,420	210,523	18,221	1,634	468	322	793
1896 ¹	1,934,077	41,622	210,523	16,807	1,555	402	297	714
1897.....	1,990,562	38,887	226,327	15,394	1,377	500	299	391
1898.....	2,048,830	40,436	233,150	15,591	922	524	376	446
1899.....	2,117,106	39,911	240,714	14,391	940	332	294	379
1900.....	2,053,979	43,227	233,587	15,646	1,121	315	372	470
1901.....	2,095,686	43,307	239,703	14,810	1,227	685	412	272

¹ Estimated July 1, 1896.

Table XVIII. — Chicago, Ill.

YEARS.	Population Estimated.	Total Deaths.	Population of Children un- der 5 years of age.	Deaths of Chil- dren under 5 years of age.	Deaths from Diphtheria.	Deaths from Scarlatina.	Deaths from Typhoid Fever.	Deaths from Measles.
1880.....	503,298	10,462						
1881.....	540,000	13,874						
1882.....	560,689	13,234		6,645				
1883.....	580,000	11,555		5,875				
1884.....	630,000	12,471		6,666				
1885.....	665,000	12,474		6,187	708	279	496	78
1886.....	704,000	13,699		6,763	944	220	483	126
1887.....	760,000	15,400		7,568	1,002	190	881	341
1888.....	830,000	15,772		7,533	858	184	875	151
1889.....	1,106,000	16,946		8,204	1,126	185	453	204
1890.....	1,200,000	21,869		9,954	881	193	1,008	67
1891.....	1,250,000	27,754		12,801	958	499	1,997	265
1892.....	1,438,000	26,219		11,662	1,014	382	1,489	185
1893.....	1,600,000	27,095		12,364	975	329	670	234
1894.....	1,567,727	23,701		12,363	841	190	491	182
1895.....	1,600,000	24,319	227,200	10,449	1,775	77	518	158
1896.....	1,619,226	23,262	192,453	15,336	955	54	751	73
1897.....	1,619,226	21,809	192,453	8,546	702	81	437	139
1898.....	1,650,000	22,747	196,183	8,135	622	67	636	55
1899.....	1,950,000	25,508	196,299	8,880	843	533	442	168
1900.....	1,698,575	24,941	220,824	8,282	797	226	337	194
1901.....	1,758,025	24,406		7,489	495	165	509	158

¹ School census, July 1, 1896.

Table XIX.—Brooklyn, N. Y.

YEARS.	Population.	Total Deaths.	Population of Children under 6 yrs. of age.	Deaths of Children under 6 yrs. of age.	Deaths from Diphtheria.	Deaths from Scarlatina.	Deaths from Typhoid Fever.	Deaths from Measles.	Deaths from Consumption.
1885.....	687,000	15,369	89,810	6,756	519	363	153	175	1,995
1886.....	747,000	15,790	97,110	7,000	782	340	123	106	2,085
1887.....	778,800	17,079	101,140	7,577	950	271	143	172	2,026
1888.....	810,000	18,061	105,300	8,019	984	475	158	59	2,051
1889.....	842,000	18,480	109,460	8,265	1,101	273	161	205	2,055
1890.....	875,000	19,827	113,750	8,462	902	227	182	111	2,169
1891.....	910,000	21,349	118,300	9,388	766	465	180	203	2,117
1892.....	945,000	20,807	122,850	8,971	775	412	162	168	2,128
1893.....	980,000	21,017	127,400	8,763	607	307	179	111	2,174
1894.....	1,045,000	21,188	135,850	9,235	1,279	188	158	204	2,260
1895.....	1,110,000	22,568	124,000	9,277	1,139	124	173	192	2,299
1896.....	1,125,000	22,497	146,000	9,006	1,063	150	163	333	2,245
1897.....	1,160,000	20,674	130,500	8,252	795	187	173	190	2,164
1898.....	1,197,100	21,856	134,793	8,414	742	159	267	193	2,384
1899.....	1,231,548	21,849	.....	8,072	588	175	205	197	2,435
1900.....	1,169,798	23,057	¹ 131,719	8,776	673	130	301	310	2,445
1901.....	1,209,064	23,271	124,500	8,151	733	496	274	160	2,474

¹ Estimated.

Table XX.—St. Louis.

YEARS.	Population.	Total Deaths.	Deaths of Children under 5 yrs. of age.	Deaths from Diphtheria.	Deaths from Scarlet Fever.	Deaths from Typhoid Fever.	Deaths from Measles.	Deaths from Consumption.
1885.....	400,000	7,490	3,090	<i>Diph.—Croup.</i> 372 — 109	164	125	54	888
1886.....	400,000	8,268	3,434	719 — 160	149	124	6	915
1887.....	420,000	9,155	3,796	927 — 185	48	116	40	829
1888.....	440,000	9,015	3,659	564 — 167	30	130	31	800
1889.....	450,000	8,004	3,149	345 — 94	114	146	63	655
1890.....	460,000	8,409	3,115	186 — 58	87	140	1	843
1891.....	480,000	9,530	3,493	250 — 90	96	165	53	869
1892.....	500,000	10,225	3,607	195 — 91	150	441	7	882
1893.....	520,000	10,303	3,548	227 — 144	79	215	26	984
1894.....	540,000	8,710	3,192	240 — 139	29	171	3	875
1895.....	560,000	9,425	3,373	512 — 171	18	107	38	1,000
1896.....	570,000	9,897	3,326	273 —	11	108	17	1,026
1897.....	600,000	9,554	2,799	170 — 70	19	123	1	997
1898.....	623,000	8,908	3,358	152 — 51	28	95	21	1,001
1899.....	640,000	10,024	3,005	192 —	34	131	15	1,061
1900.....	575,200	9,849	.....	344 — 64	57	148	45	1,006
1901.....	593,000	10,601	.....	259 —	69	176	34	1,128

Table XXI. — London, England.

YEARS.	Population.	Total Deaths.	Population of Children under 5 years of age.	Deaths of Children under 5 years of age.	Deaths from Diphtheria.	Deaths from Scarlatina.	Deaths from Typhoid Fever.	Deaths from Measles.
1880.....	3,771,189	81,882	.....	36,220	544	3,100	702	1,521
1881.....	3,824,960	81,071	497,044	33,325	654	2,108	977	2,533
1882.....	3,861,376	82,905	.....	36,259	863	2,004	975	2,329
1883.....	3,901,164	80,578	.....	33,532	961	1,989	935	2,420
1884.....	3,939,882	83,050	.....	36,080	973	1,444	936	2,285
1885.....	3,978,883	80,000	.....	32,913	896	707	585	2,928
1886.....	4,018,321	82,276	.....	34,319	846	688	618	2,073
1887.....	4,058,150	82,304	.....	35,236	963	1,419	612	2,904
1888.....	4,098,374	79,069	.....	32,669	1,311	1,190	694	2,425
1889.....	4,138,996	76,026	.....	30,469	1,616	771	528	2,306
1890.....	4,180,021	89,554	.....	36,123	1,417	876	618	3,291
1891.....	4,221,452	90,216	501,558	33,340	1,361	589	547	1,907
1892.....	4,263,294	87,749	.....	34,560	1,385	1,174	436	3,398
1893.....	4,306,411	91,536	.....	35,200	3,265	1,596	719	1,661
1894.....	4,349,166	77,039	.....	31,366	2,670	962	635	3,293
1895.....	4,392,546	86,387	.....	35,095	2,316	829	614	2,633
1896.....	4,431,955	88,511	.....	35,599	2,683	942	591	3,697
1897.....	4,463,169	80,944	.....	32,238	2,263	781	593	1,923
1898.....	4,504,786	83,386	536,522	34,184	1,772	583	585	3,075
1899.....	4,506,752	89,689	541,523	32,073	1,964	398	801	2,143
1900.....	4,589,129	86,007	546,570	30,979	1,558	361	756	1,936
1901.....	4,544,983	79,924	.....	.....	1,344	584	543	1,963

Table XXII. — Paris, France.

YEARS.	Population.	Total Deaths.	Population of Children under 5 years of age. ¹	Deaths of Children under 5 years of age.	Deaths from Diphtheria.	Deaths from Scarlatina.	Deaths from Typhoid Fever.	Deaths from Measles.
1880.....	.....	55,706	.....	17,674	2,048	345	2,003	962
1881.....	2,239,938	55,103	148,601	17,159	2,211	440	1,955	897
1882.....	.....	56,854	.....	17,158	2,244	156	3,214	1,005
1883.....	.....	54,768	.....	16,843	1,781	88	1,880	1,043
1884.....	.....	55,059	.....	16,968	1,928	155	1,503	1,501
1885.....	.....	52,726	.....	15,244	1,655	191	1,320	1,524
1886.....	2,260,945	55,110	146,177	16,493	1,512	403	954	1,210
1887.....	.....	52,836	.....	15,206	1,585	224	1,385	1,628
1888.....	.....	51,230	.....	14,463	1,729	193	756	915
1889.....	.....	54,083	.....	14,679	1,706	170	1,008	1,190
1890.....	.....	54,566	150,490	15,068	1,668	223	665	1,495
Census of 12th April, 1891.	2,424,705	.....	.....	.....	.....	.....	.....	.....
1891.....	2,424,705	54,443	150,490	14,043	1,531	208	549	1,020
1892.....	2,424,705	54,536	150,490	14,353	1,403	196	691	999
1893.....	2,424,705	52,955	.....	13,046	1,266	177	570	877
1894.....	2,424,705	² 49,205	150,490	11,901	1,009	151	697	993
1895.....	2,424,705	51,451	.....	.....	421	179	274	682
1896.....	2,511,629	47,929	188,941	10,363	444	190	262	656
1897.....	2,511,629	46,988	156,494	10,528	298	65	249	821
1898.....	2,511,629	49,574	156,494	11,671	269	138	256	876
1899.....	2,511,629	50,511	.....	.....	336	196	754	901

¹ Estimated, 1891.² Inhabitants of Paris only.

TABLE XXIII. — Berlin, Germany.

YEARS.	Population.	Total Deaths. ¹	Population of Children under 5 years of age.	Deaths of Children under 5 years of age.	Deaths from Diphtheria.	Deaths from Scarlatina.	Deaths from Typhoid Fever.	Deaths from Measles.
Beginning ...	1,089,070	.....	142,476					
1880.....		32,823	.....	19,249	1,198	872	527	376
End.....	1,123,749	.....	188,060					
1881.....		31,065	.....	17,483	1,503	908	352	201
End.....	1,159,539	.....	143,328					
1882.....		30,465	.....	16,990	1,914	604	357	144
End.....	1,196,205	.....	146,138					
1883.....		35,056	.....	19,902	2,651	867	222	1,173
End.....	1,232,716	.....	144,464					
1884.....		32,932	.....	18,440	2,446	395	243	295
End.....	1,271,677	.....	144,630					
1885.....		31,483	.....	15,558	1,816	409	214	406
End.....	1,315,656	.....	146,227					
1886.....		34,298	.....	19,215	1,535	271	181	565
End.....	1,363,081	.....					
1887.....		30,336	.....	15,777	1,305	267	198	223
End.....	1,415,269	.....					
1888.....		29,298	.....	15,076	1,018	201	168	364
End.....	1,472,151	.....					
1889.....		34,460	.....	18,394	1,189	244	290	201
End.....	1,523,721	.....					
1890.....		33,393	.....	17,630	1,492	298	143	441
End.....	1,579,524	.....	164,370					
1891.....	1,601,327	.....		16,800	1,010	150	166	180
1892.....	1,656,715	32,696	172,378	16,319	1,325	58	137	217
1893.....	1,714,938	36,082	.....	.....	1,578	582	161	341
1894.....	1,855,235	30,961	176,200	14,649	1,361	443	69	208
1895.....	1,877,804	33,627	164,258	16,034	934	817	95	175
1896.....	1,895,313	30,578	.....	13,443	515	333	80	111
1897.....	1,758,845	30,622	58,339	13,825	507	217	71	161
1898.....	1,805,054	30,571	56,751	13,595	608	268	78	119
1899.....	1,817,952	34,011	166,888	14,878	609	525	74	530
1900.....	1,864,203	35,409	.....	15,498	534	502	109	195
1901.....	1,891,900	34,091	.....	14,839	469	492	88	174

¹ Census of December 1, 1890.² Excluded: Still-born, 1,749, 1,771, 1,759, 1,707, 1,778, 1,848, 1,710, 1,761, 1,756, 1,789, 1,478.

Table XXIV. — Vienna, Austria.

YEARS.	Population.	Total Deaths.	Population of Children under 5 years of age.	Deaths of Children under 5 years of age.	Deaths from Diphtheria and Croup.	Deaths from Scarlatina.	Deaths from Typhoid Fever.	Deaths from Measles.
1880	721,016	20,453	58,023	8,219	597	172	171	96
1881	731,208	21,549	.....	8,224	539	286	171	106
1882	749,919	21,595	.....	8,903	522	410	187	203
1883	750,762	21,194	.....	7,980	360	150	157	246
1884	759,649	20,353	.....	7,688	342	130	95	344
1885	769,889	21,976	.....	8,668	464	83	106	289
1886	780,066	20,869	.....	8,114	546	124	85	333
1887	790,381	20,549	.....	7,912	455	391	80	493
1888	800,636	20,349	.....	7,547	521	230	107	253
1889	811,434	20,106	.....	7,624	513	139	103	364
1890	822,176	20,324	69,710	7,853	536	92	77	459
1891	1,378,530	34,479	130,808	15,610	1,311	271	85	855
1892	1,406,933	35,134	.....	16,843	1,580	242	116	825
1893	1,435,931	34,515	130,808	15,002	1,615	311	105	1,225
1894	1,465,637	33,994	140,545	15,073	1,679	413	74	898
1895	1,495,764	34,879	.....	15,021	710	437	86	754
1896	1,526,623	34,132	.....	14,685	621	436	79	930
1897	1,551,129	33,187	.....	13,946	575	236	84	857
1898	1,590,295	32,356	.....	13,593	520	227	93	794
1899	1,623,134	33,333	.....	.....	463	261	66	684
1900	1,656,662	34,303	.....	13,650	306	168	137	741

Table XXV. — Glasgow, Scotland.

YEARS.	Population.	Total Deaths.	Population of Children under 5 years of age.	Deaths of Children under 5 years of age.	Deaths from Diphtheria.	Deaths from Scarlatina.	Deaths from Typhoid Fever.	Deaths from Measles.
1880.....	.....	12,303	.....	6,071	150	453	278	331
1881 census...	511,415	12,909	69,931	5,386	162	256	166	333
1882.....	.....	12,985	.....	5,972	177	263	162	213
1883.....	.....	14,476	.....	6,494	132	449	167	605
1884.....	.....	13,839	.....	6,174	157	412	184	535
1885.....	.....	13,444	.....	6,156	112	228	102	430
1886.....	.....	13,053	.....	5,601	111	345	81	90
1887.....	.....	12,055	.....	5,367	174	234	100	302
1888.....	.....	11,533	.....	4,743	168	163	59	205
1889.....	.....	12,890	.....	5,970	167	109	111	594
1890.....	.....	13,222	.....	5,768	139	124	108	583
1891 census...	565,710	14,149	72,481	5,432	131	201	123	400
1892.....	669,059	15,128	84,860	6,306	162	304	102	731
1893.....	677,883	15,798	85,968	6,953	208	263	120	855
1894.....	686,820	13,674	87,103	5,326	245	204	150	250
1895.....	696,876	16,332	88,250	6,458	113	180	121	380
1896.....	705,052	14,388	89,413	6,153	88	139	139	814
1897.....	714,419	15,727	90,665	6,750	97	132	172	574
1898.....	724,849	15,333	91,861	6,530	103	188	223	536
1899.....	733,908	15,823	93,073	6,196	106	202	179	546
1900.....	755,730	15,924	.....	6,487	125	210	158	461

Table XXVI. — Liverpool, England.

YEAR.	Population.	Total Deaths.	Population of Children under 5 years of age.	Deaths of Children under 5 years of age.	Deaths from Diphtheria.	Deaths from Scarlatina.	Deaths from Typhoid Fever.	Deaths from Measles.
1884	541,081	14,383	.....	6,908	80	197	112	611
1885	537,548	13,764	.....	6,213	133	190	95	716
1886	534,088	13,919	.....	6,152	125	277	140	273
1887	530,649	14,006	.....	6,218	95	321	130	661
1888	527,233	12,159	.....	5,070	66	187	125	331
1889	523,838	13,047	.....	5,921	57	353	167	485
1890	520,466	14,298	.....	6,319	104	577	99	535
1891	517,145	13,911	.....	5,697	63	119	92	320
1892	513,818	12,671	.....	5,322	47	131	111	456
1893	510,514	13,919	.....	6,035	47	231	221	273
1894	507,230	13,073	64,544	5,214	65	233	248	299
1895	638,291	16,215	78,411	7,201	97	168	192	397
1896	632,512	14,617	.....	.....	157	227	206	306
1897	644,129	15,590	78,411	6,972	91	209	145	344
1898	668,645	15,380	.....	6,489	123	145	148	233
1899	668,645	16,269	83,042	7,039	189	164	174	320
1900	668,645	16,398	83,042	6,417	143	113	120	150
1901	686,322	15,493	85,238	6,473	158	192	154	472

REMOVAL OF BODIES.

During the year 1901 permits were given for the removal of 385 bodies, chiefly from one cemetery to another.

STILL-BIRTHS.

In living births a larger proportion of males than females is born each year. In still-births the proportion is vastly larger. The still-born males in Massachusetts (exclusive of those whose sex was not stated) for the ten years 1890–1899 were 158, 1 to 100 females, in the year 1899, 154, 1 to 100 females, and in 1900, 150, 2 to 100 females. The stillborn males in the City of Boston for the year 1901 were in the ratio of 144, 3 to 100 females. The appended table, XXVII., shows that there has been a steady decreasing ratio of the still-births to the total births for a period of twenty years.

Table XXVII. Still-births by Months with Percentages to Total Births and Ratio to 1000 Inhabitants for Twenty Years.

	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.	* Total Num- ber of Liv- ing Births.	Percentages to Total Births.	Ratio to 1000 Inhabitants.
1882.....	40	34	53	38	45	42	35	52	39	49	47	45	518	10,986	4.50	1.36
1883.....	57	40	40	53	45	37	38	48	36	41	36	33	504	11,302	4.27	1.17
1884.....	44	44	28	45	42	40	49	53	45	41	46	36	503	11,479	4.20	1.17
1885.....	42	41	51	36	50	41	39	42	48	38	44	48	520	11,498	4.33	1.30
1886.....	38	37	46	62	35	38	46	63	43	38	48	49	543	11,960	4.33	1.35
1887.....	45	54	40	48	36	44	34	57	37	43	48	48	534	12,137	4.21	1.33
1888.....	48	48	38	34	52	56	48	40	55	38	48	47	552	12,613	4.19	1.33
1889.....	43	51	49	54	61	59	46	50	46	51	44	44	598	12,787	4.47	1.43
1890.....	55	40	52	58	49	42	51	49	54	50	68	59	627	13,289	4.50	1.39
1891.....	46	47	58	48	55	51	56	49	40	50	57	57	614	13,497	4.21	1.33
1892.....	44	48	51	57	60	58	51	55	44	54	57	54	633	15,154	4.01	1.34
1893.....	54	49	52	59	42	41	51	57	51	38	50	61	605	14,602	3.98	1.34
1894.....	56	56	60	50	69	82	49	45	53	72	65	44	700	15,401	4.35	1.39
1895.....	38	47	52	62	41	58	56	68	50	39	51	50	607	15,613	3.74	1.31
1896.....	69	48	51	48	44	57	51	62	50	51	58	59	648	16,484	3.71	1.35

1897.....	52	55	61	55	62	43	42	46	58	53	40	48	614	16,973	3.49	1.16
1898.....	50	48	49	61	56	45	55	38	54	49	52	58	613	16,680	3.54	1.13
1899.....	46	60	41	43	46	53	41	43	35	37	56	39	539	16,247	3.21	0.97
1900.....	51	36	63	53	47	41	49	46	42	57	41	47	573	16,420	3.39	1.02
1901.....	42	50	45	42	56	46	40	55	44	53	37	61	576	† 16,229	3.43	1.00
Totals.....	990	933	973	1,006	993	973	927	1,011	923	943	938	977	11,621	231,839	—	—
Average.....	48	47	49	50	50	49	46	50	46	47	50	49	531	14,092	3.36	1.25

* Taken from the records of the City Registrar.

† Estimated.

Table XXVIII.—Cremations in the United States, 1876-1901, Inclusive.

CREMATION.

For centuries the method of disposal of the dead was entombment and earth-burial. About a quarter of a century ago cremation of dead bodies was introduced and this method is now gradually spreading among civilized nations as will be seen by the following table.

In order to ascertain the annual increasing number of cremations, official inquiries were addressed to the superintendents of the different crematories in the United States and Europe.

CREMATORIES.	Date estab- lished.	1876 to	1883.	1884.	1885.	1886.	1887.	1888.	1889.	1890.	1891.	1892.	1893.	1894.	1895.	1896.	1897.	1898.	1899.	1900.	1901.	Total.
		1876 to	1883.	1884.	1885.	1886.	1887.	1888.	1889.	1890.	1891.	1892.	1893.	1894.	1895.	1896.	1897.	1898.	1899.	1900.	1901.	Total.
New York City (U. S. Cremation Co.).....	1885	.....	.....	.....	9	77	67	83	106	160	187	186	232	243	296	330	331	468	536	602	654	4,507
Buffalo, N. Y.....	1885	.....	.....	.....	1	8	17	16	23	30	38	27	30	31	41	28	44	40	43	67	50	534
Troy, N. Y.....	1890	.....	.....	.....	.....	.....	.....	.....	.....	4	10	14	15	12	10	18	14	13	20	16	19	165
Swinburne Island, N. Y.....	1889	.....	.....	.....	.....	.....	.....	.....	.....	2	.....	60	28	8	1	1	3	3	4	2	3	115
Waterville, N. Y.....	1893	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	1	6	5	4	4	6	10	1	38
St. Louis, Mo.....	1888	.....	.....	.....	.....	.....	.....	21	20	42	60	64	72	87	96	86	118	109	123	142	135	1,178
Philadelphia, Pa.....	1888	.....	.....	.....	.....	.....	.....	14	28	31	51	62	68	74	88	85	78	114	99	118	118	1,098
San Francisco, Cal. (Odd Fellows').....	1895	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	66	101	214	260	347	547	666	2,201
Boston, Mass.....	1893	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	87	88	136	160	167	235	188	171	1,323
Cincinnati, O.....	1887	.....	.....	.....	.....	.....	11	21	34	45	43	34	42	38	66	46	71	59	56	81	89	736
San Francisco, Cal. (Cypress Lawn).....	1893	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	42	111	88	70	64	65	107	98	91	726
Chicago, Ill.....	1893	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	6	42	66	54	82	130	137	198	182	877

Los Angeles, Cal.....	1887	...	...	...	...	7	5	12	17	29	41	37	38	37	34	28	53	59	68	523
Detroit, Mich.	1887	...	...	...	...	3	10	14	24	21	33	47	23	31	29	44	51	58	56	474
Pittsburg, Pa.	1888	...	...	...	...	14	9	11	8	9	13	14	13	10	13	16	23	19	31	241
Baltimore, Md.....	1889	...	...	...	...	...	...	...	3	5	12	16	22	15	11	21	14	22	18	198
Lancaster, Pa.....	1884	...	8	36	14	13	6	1	3	1	3	5	2	1	1	1	3	4	2	100
Davenport, Ia.....	1881	...	...	...	...	...	...	...	...	6	7	13	8	8	9	23	17	18	24	163
Milwaukee, Wis.....	1885	...	...	...	...	...	...	...	...	...	...	...	...	...	21	34	30	53	40	223
Washington, D. C.....	1886	...	...	...	...	...	...	...	...	...	...	...	...	...	...	25	38	25	24	145
Pasadena, Cal.....	1886	...	...	...	...	...	...	...	...	...	...	...	...	4	14	13	24	31	26	168
Washington, Pa.....	1876	25	13	1	1	...	...	...	...	...	...	...	3	...	...	...	...	...	1	44
St. Paul, Minn.....	1887	...	...	...	...	...	...	...	...	...	...	...	...	...	2	11	32	17	20	82
Fort Wayne, Ind.....	1885	...	...	...	...	...	...	...	...	...	...	...	...	...	...	5	1	3	4	17
Middletown, Conn. (Asylum)	1887	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Mt. Auburn, Mass. (Cambridge)	1900	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	50	169
Totals.....	.....	25	16	47	114	127	190	249	372	471	561	674	831	1,017	1,101	1,391	1,699	2,012	2,379	3,646
																				15,923

SUMMARY OF CREMATORIES AND CREMATIONS IN SEVERAL EUROPEAN CITIES.

CREMATORIES.	1878.	1879.	1880.	1881.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.	1890.	1891.	1892.	1893.	1894.	1895.	1896.	1897.	1898.	1899.	1900.	1901.	Totals.
Germany.																									
{ Gotha.....	1	17	16	33	33	46	69	76	96	110	95	128	111	162	162	183	189	132	147	188	179	200	189	218	2,699
{ Heidelberg.....														3	57	50	79	91	96	105	125	151	146	104	1,007
{ Hamburg.....															2	48	98	41	70	81	98	111	145	.....	694
{ Jena.....																					21	46	47	.....	114
{ Offenbach.....																						5	110	.....	115
Total.....	1	17	16	33	33	46	69	76	96	110	95	128	111	165	221	261	316	264	313	374	423	513	637	922	4,629
England.																									
{ London.....								3	10	13	28	46	54	96	104	101	125	150	137	178	240	240	301	....	1,834
{ Manchester.....															3	20	47	58	52	51	62	88	84	....	465
{ Glasgow.....																		1	10	16	12	16	20	....	75
{ Liverpool.....																			7	23	23	40	9	....	102
Total.....								3	10	13	28	46	54	96	107	121	172	209	206	263	337	384	414	....	2,466
Sweden.																									
{ Stockholm.....										13	23	46	27	48	41	51	42	31	47	54	49	54	54	....	580
{ Gottenburg.....													11	9	11	12	7	3	14	19	24	21	16	147
Total.....										13	23	46	38	57	52	63	49	34	61	73	73	75	70	727

HEALTH DEPARTMENT.

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France.	{ Paris.....	749	3,388	3,741	3,974	3,911	3,902	4,180	4,423	4,197	4,513	4,554	5,935	47,447
	{ Rouen.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	5	4	.....	9
	{ Total.....	749	3,388	3,741	3,974	3,911	3,902	4,180	4,423	4,197	4,513	4,559	5,939	.....	47,456
Switzerland.	{ Zurich.....	21	32	39	39	41	40	44	64	69	82	81	116	126	794
	{ Basl.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	17	14	20	.....	51
	{ Total.....	21	32	39	39	41	40	44	64	69	99	95	136	126	845
Denmark.	{ Copenhagen.....	.....	.....	.....	.....	4	12	18	21	14	18	28	28	.....	143

**Classes that are Cremated in the Crematorium in the Cemetery
of Pere la Chaise, Paris.**

YEARS.	* Cremated at Request of the Family.	† Unclaimed Bodies in Hospitals, etc.	Fetuses.	Total.
1889.....	49	483	217	749
1890.....	121	2,188	1,079	3,388
1891.....	134	2,369	1,238	3,741
1892.....	159	2,389	1,426	3,974
1893.....	189	2,261	1,461	3,911
1894.....	216	2,247	1,529	3,992
1895.....	187	2,482	1,511	4,180
1896.....	200	2,587	1,636	4,423
1897.....	210	2,356	1,631	4,197
1898.....	231	2,493	1,789	4,513
1899.....	243	2,538	1,773	4,554
1900.....	297	2,752	2,776	5,825
Total.....	2,236	27,145	18,066	47,447

* Edito a cura della Società Cremazione in Bologna.

† The incineration of unclaimed bodies and fetuses commenced August 5, 1889.

* CITIES.	Date of Inauguration.	1876.	1877.	1878.	1879.	1880.	1881.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.	1890.	1891.	1892.	1893.	1894.	1895.	1896.	1897.	1898.	1899.	1900.	Total.
ITALY.																											
Milan.....	1876	2	9	14	25	40	70	67	44	61	70	61	55	76	85	72	65	66	74	72	64	65	104	92	99	92	1,544
Lodi.....	1877	...	6	2	2	5	5	2	2	2	1	4	1	3	3	3	3	1	3	...	1	...	...	...	...	1	50
Rome.....	1883	...	...	...	...	...	...	...	15	29	43	32	33	59	90	74	47	75	55	61	54	49	37	29	55	52	889
Cremone.....	"	...	...	...	...	...	...	...	4	16	5	23	9	10	10	5	8	4	3	4	7	3	3	2	3	6	136
Brescia.....	"	...	...	...	...	...	...	...	5	2	2	5	4	3	2	2	4	1	1	3	2	1	3	3	3	2	48
Iadue.....	1884	...	...	...	...	...	...	...	...	4	5	5	4	7	5	6	4	3	8	3	3	4	2	3	4	...	70
Udine.....	"	...	...	...	...	...	...	...	...	2	4	5	...	4	2	3	2	6	2	2	2	1	1	3	2	6	47
Varese.....	"	...	...	...	...	...	...	...	...	1	1	1	5	...	5	...	1	2	1	...	1	3	3	2	2	...	28
Spezia.....	1885	...	...	...	...	...	...	...	...	...	1	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	3
Novara.....	"	...	...	...	...	...	...	...	...	...	1	2	2	1	3	1	...	7	1	3	1	1	1	2	4	...	30
Florence.....	"	...	...	...	...	...	...	...	...	...	14	16	26	18	21	20	16	24	18	19	24	11	14	13	14	17	285
Livorno.....	"	...	...	...	...	...	...	...	...	...	8	13	20	10	20	26	9	16	16	11	9	24	9	13	13	14	221
Asti.....	"	...	...	...	...	...	...	...	...	...	1	...	4	3	3	2	3	4	...	2	...	1	...	4	...	1	28
Pisa.....	"	...	...	...	...	...	...	...	...	...	8	3	1	3	2	8	1	7	6	7	3	1	2	2	6	10	70
Alexandria.....	1886	...	...	...	...	...	...	...	...	...	...	1	...	1	...	...	...	...	...	...	...	...	...	...	...	...	2

* Dott. Lodovico Forresti Statistica della Cremazioni Esequie in Europa Nel Secolo XIX., 1876-1900. Edito a cura della Società di Cremazioni in Bologna.

*CITIES.	Date of Inauguration.	1876.	1877.	1878.	1879.	1880.	1881.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.	1890.	1891.	1892.	1893.	1894.	1895.	1896.	1897.	1898.	1899.	1900.	Total.	
Como.....	1886	5	2	2	3	1	2	2	2	2	1	1	3	2	1	1	28
Turin.....	1887	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	18	12	10	28	14	22	21	11	22	17	28	14	19	237
" Mantua.....	"	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	1	2	1	3	4	8	3	4	.....	3	2	4	1	37
St. Remo.....	1888	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	5	10	10	9	9	9	4	7	5	5	11	6	6	96
" Verona.....	"	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3	2	2	2	1	.....	3	1	.....	3	1	1	1	20
Bologna.....	1889	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	10	12	5	11	3	11	14	20	19	26	22	155
Modena.....	1890	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3	1	4	1	2	3	3	.....	3	1	4	24
Venice.....	1891	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	7	5	5	5	3	7	4	4	2	48
Spoleto.....	1894	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Terni.....	1895	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
" Siena.....	"	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Bera.....	1897	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total.....		2	15	16	27	45	75	69	70	116	164	180	168	237	282	256	221	262	246	238	220	219	242	241	265	292	4,110	

* Dott. Lodovico Forresteri Statistica delle Cremazioni Esecutive in Europa Nel Secolo XIX., 1876-1900. Editto a cura della Società di Cremazioni in Bologna.

NUISANCES ABATED.

The following table shows the number of nuisances abated by owners or occupants of premises, upon notice from the Board of Health:

	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.
House drains repaired	263	213	221	261	271	238	244	248	246	194	147	171	2,717
Vaults cleaned and repaired	5	3	6	16	11	12	19	9	8	7	2	4	102
Traps supplied	112	70	76	107	95	91	56	79	84	42	48	66	926
Yards cleaned	68	32	261	289	197	156	141	115	129	96	64	44	1,587
Cellars cleaned	105	78	104	281	277	191	223	237	190	148	118	150	2,117
Cesspools cleaned.	12	6	14	44	47	46	29	50	33	10	36	13	340
Water-closets cleaned and repaired	296	271	291	366	393	293	340	342	293	261	239	266	3,654
Number of places from which fowls were removed ..	10	2	10	17	14	18	25	23	15	6	4	3	147
Supply pipes repaired	35	57	20	21	33	31	34	29	17	17	10	22	326
Privies cleaned and repaired .....	.....	.....	1	.....	.....	1	2	.....	.....	.....	.....	.....	4
General cleaning and repairing	98	97	84	159	161	131	149	90	81	66	50	86	1,349
Dark rooms corrected	10	10	175	361	281	135	170	147	157	261	69	162	1,958
Dark and unventilated water-closets remedied.	69	69	68	131	111	163	105	85	107	158	171	111	1,346
Exposed manure removed	1	2	2	2	.....	2	3	6	3	.....	.....	.....	21
Passageways cleaned	18	6	52	34	25	35	51	34	53	15	20	17	355
Sheds cleaned	6	3	24	32	14	28	26	21	14	5	9	6	188
Tenement white-washed	23	37	118	373	348	203	193	133	114	151	117	74	1,884
Stables cleaned	3	3	1	10	8	4	9	7	4	3	6	2	60
Sundry nuisances abated	35	44	80	120	73	135	175	164	197	207	87	117	1,434
Rain conductors repaired	4	3	8	8	5	7	14	10	6	6	4	5	80
Roofs repaired	5	3	16	23	16	6	16	5	8	5	14	10	127
Receptacles provided for garbage	18	9	32	104	66	92	112	91	68	62	42	26	722

NUISANCES ABATED. — *Concluded.*

	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.
Places from which swine were removed				2			8						5
Stagnant water removed from vacant lots			6	20	27	10	12	11	5	7	4	2	104
Vacant lots cleaned	4	3	10	19	16	14	4	3	15	5	4	9	106
Houses cleared of dead rats		1	1	3	3	1	1					1	11
Overcrowded rooms relieved..	5	25	39	91	70	43	60	23	39	33	26	41	495
Gas-pipes repairs..	4	7		9	3	5	1	2	3	2	5	2	43
Total	1,194	1,054	1,720	2,903	2,565	2,091	2,217	1,984	1,892	1,782	1,296	1,412	22,110

REPORT OF DISINFECTION, YEAR 1901.

Diphtheria (after)	.	3,308	Streets	.	.	.	.	360
Scarlet fever	"	1,386	Places	.	.	.	.	1,173
Measles	"	21	Courts	.	.	.	.	1,355
Phthisis	"	1,148	Alleys	.	.	.	.	4,131
Small-pox	"	505	Passageways	.	.	.	.	6,043
Erysipelas	"	8	Yards	.	.	.	.	16,167
Cancer	"	13	Vaults	.	.	.	.	366
Typhoid fever	"	19	Cellars	.	.	.	.	9,391
Glanders	"	131	Gutters	.	.	.	.	5,668
Infected bedding, etc.	Lots	139	Water-closets	.	.	.	.	8,358
" books, etc.	"	509	Urinals	.	.	.	.	618
" clothing, etc.	"	208	Vacant lots	.	.	.	.	1,156
" carriages	.	38	Filthy rooms	.	.	.	.	3,573
" schools	.	173	Filthy sheds	.	.	.	.	7,940
			Sinks	.	.	.	.	12,907
Total	.	7,606	Cesspools	.	.	.	.	14,336
Rooms disinfected	.	11,747	Total	.	.	.	.	92,942

MATERIALS USED.

Formaldehyde	.	.	.	.	.	.	2,075 gallons.
Alcohol for heat	.	.	.	.	.	.	925 "
Chloride of lime	.	.	.	.	.	.	56,750 lbs.
Bichloride of mercury	.	.	.	.	.	.	1,000 "
Chloride of sodium (in mixing)	.	.	.	.	.	.	1,100 "

REGULATIONS.

During the past year the Board has found it necessary to adopt the following regulations :

BOSTON, February 28, 1901.

At a meeting of the Board of Health, this day, the following regulation was adopted :

Whereas, The Board of Health is of the opinion that walls, hitching-bars, chains and ropes in horseshoeing shops, to which animals affected by a disease known as glanders have been secured, are liable to become the means of spreading said disease to healthy animals subsequently secured to such walls, hitching-bars, chains and ropes, it is therefore

Ordered, That the walls, hitching-bars, chains, ropes, or other apparatus in horseshoeing shops, to or by which horses may at any time be secured, shall be thoroughly disinfected by the proprietor of such shops with a 5 per cent. solution of chloride of lime at the close of each day's business.

INSTRUCTIONS.

The best way to carry out the above regulation is as follows :

First. Fill a 50-gallon barrel with water.

Second. Add 20 lbs. fresh chloride of lime.

Third. Stir thoroughly and *keep tightly covered*.

This mixture will settle out after a short time and leave a clear liquid in the upper part of the barrel.

To use this, take out as much of the clear liquid in wooden pails as may be required at any one time.

First. Dip all chains and ropes used for hitching into a pail full of the clear liquid.

Second. Thoroughly wet down with the clear liquid the entire wall to which horses have been secured by spraying with an ordinary pump such as is used for washing windows. (If preferred, a broom may be used instead of a pump, as in applying whitewash.)

CAUTION.— *Whenever the clear liquid in the barrel is all used, the sediment should be dumped out and a fresh mixture made. If the liquid is not used up in two weeks what remains must be poured out, the sediment removed, and a fresh mixture made, because after two weeks it loses strength rapidly.*

If a pump is used, a spraying nozzle must be attached; wash out pump thoroughly after each use, and oil with kerosene.

NOTE.— If inconvenient to make the mixture in a 50-gallon barrel, it may be made in smaller quantities, but the mixture must always be of the same strength (not less than 1 lb. of chloride of lime to 2½ gallons of water).

Boston, July 11, 1901.

At a meeting of the Board of Health, this day, the regulation dated October 13, 1896, respecting the deposit of sputum in street cars and other public places, amended March 23, 1899, is hereby again amended so as to read as follows:

The Board of Health hereby adjudges that the deposit of sputum in public places is a nuisance, source of filth and cause of sickness, and hereby orders: That spitting upon the floor, platform, or steps of any railroad or railway station, or car, or from any electric car while said car is in the subway or elevated above the surface of the ground, or upon the floor, platform or steps of any public building, hall, church, theatre, market, or any sidewalk immediately connected with said public places, be, and hereby is, prohibited.

Boston, August 22, 1901.

At a meeting of the Board of Health, this day, it was voted to amend the regulation of October, 1896, by inserting after the word "meat" in the fifth line, the following: "Or the keeping, sorting or breaking or otherwise handling of rotten or offensive eggs," so that the regulation as adopted shall read thus:

"The Board of Health hereby forbids the exercise of the trades or employments of slaughtering animals, rendering animal matter (except fresh tallow), manufacturing fertilizers, mixing or storing refuse, animal or vegetable substances, smoking fish or meat, or the keeping, sorting or breaking or otherwise handling of rotten or offensive eggs, refining oils, making varnish, asphaltum, glue, gasoline, or any burning fluid within the limits of the City of Boston, except at such place or places as may be assigned by said Board; such trades or employments being nuisances, hurtful to the inhabitants of said city, dangerous to the public health, attended by noisome and injurious odors, and otherwise injurious to the estates of said inhabitants."

Boston, August 22, 1901.

At a meeting of the Board of Health this day, it was voted to adopt the following regulation respecting the delivery of coal, beating carpets, and the erection and demolition of buildings.

"No substance in any way liable to be distributed or blown about by wind or air currents shall be sieved, screened, agitated, or otherwise handled or exposed in any street or public place, nor elsewhere in such a manner that particles or portions of such substances are scattered, blown or otherwise pass into or upon any such street or public place, or into or upon any

inhabited buildings. This shall not apply to the delivery of coal, provided suitable precautions for dampening are taken.

"No carpets, rugs, mats or similar articles shall be beaten in any street or public place, and no carpets, rugs, mats, old garments, or similar articles shall be beaten or cleaned upon or near inhabited buildings unless reasonable precaution is taken to prevent dust particles or portions of said articles from being blown, scattered or otherwise passing from the place where such beating or cleaning is carried on.

"No work shall be done upon any building or other structure while in course of erection, alteration or demolition, unless every reasonable precaution is taken to prevent dust or fragments of lime, mortar or other similar material from being blown or carried into or upon any street, public place or inhabited buildings."

December 26, 1901.

It was unanimously voted to pass the following regulation respecting vaccination :

Whereas, Small-pox has been prevalent to some extent in the City of Boston, and still continues to exist, although the number of cases has much decreased, owing largely to the voluntary vaccination of the great majority of the inhabitants ; and

Whereas, It is necessary, for the speedy extirpation of the disease, that all persons not protected by vaccination should be vaccinated ; and

Whereas, In the opinion of this Board, the public health and safety require the vaccination or re-vaccination of all the inhabitants of Boston ;

Be it ordered, That all the inhabitants of the city who have not been successfully vaccinated since January 1, 1897, be vaccinated or re-vaccinated forthwith.

TENEMENT HOUSES.*

The Board of Health is mindful of the fact that the tenement-house law and the tenement-house conditions in Boston are unsatisfactory, and that the conditions which we regard as unsatisfactory are so general as to make it inadvisable to tear down or vacate to any large extent without first securing alterations in the law by which better provision can be secured for the health and comfort of the occupants, and until a sufficient number of tenement houses can be built to properly care for the tenement-house population. The lawful and unlawful conversion of old single dwellings into

* "'Tenement house' means a building which, or any portion of which, is occupied, or intended to be occupied, as a dwelling by more than three families living independently of one another and doing their cooking upon the premises, or by more than two families above the first story so living and cooking, and includes apartment houses, family hotels, and flat-houses, where families are so living and cooking."

tenement houses in this city has been one of the greatest evils and is a source of much annoyance, and in many instances a lawful obstruction to tenement house improvement. The Board has examined with great care and deep interest the tenement-house law which has recently been enacted in the State of New York. We find in it very much which is an improvement over our own law, and which we could cheerfully adopt and do earnestly recommend for our own tenement houses.

During the year 1901 a most thorough and systematic inspection of the tenement houses has been made, and there is now on file in this office a complete record of every tenement house in Boston. The following is a sample of the blank used for the purpose and the scope of the inspection :

Drainage.	7	6	5	4	3	2	1	Feet.
Traps.								No. of Tenants.
Water-closets. No. and location. }								No. of Rooms.
Sinks, No. and location. }								No. of Ainils.
Dark rooms.								No. of Children.
Cellar.								No. of Lodgers.
Basement rooms.								No. of Prisons
Halls, how lighted.								Altered.
Yard.								
Overcrowded.								
Garbage receptacles.								
Whitewashing, Walls and ceilings. }								
Name of owner								
Posted (Yes or No).								
Name of janitor.								

The inspection has been thorough, and the Board of Health will endeavor with renewed energy to diminish the unsanitary and unhealthful conditions found to exist as a result of this inspection. In our report of 1900 we called attention to bad features in old private houses which had been altered over into tenement houses. In making this inspection the fact has been very forcibly brought to our attention of unsanitary conditions existing in a large number of the recently erected tenement houses. These defects are largely want of light and air. The tendency is almost entirely towards the construction of fireproof buildings with almost no attention given to light or ventilation. In a great many of these buildings light and air are taken from a small air shaft which is practically ineffective, and in most cases the same shaft supplies light and air to the chambers, pantries and water-closet rooms. In some cases these windows are very close to each other, and the buildings are from four to six stories in height, with water-closets, chambers and pantries on each floor. A great many of these shafts are of such small area that they furnish no light and very little ventilation, and, although these buildings are erected within the strict letter of the building law, they are in a very unsanitary condition. In one instance a building which was demolished by order of the Board of Health on account of the lack of light and air was replaced by a new building, erected under the building law, and fulfilling all its requirements; but on its completion and occupancy the conditions as to light and ventilation were found so bad that the Board of Health ordered the tenants out until the sanitary conditions were improved.

Another very bad feature found in the examination of these recently erected buildings is the almost absolutely dark halls and stairways found to exist under this fireproof construction, which forces the Board to the conclusion that some little attention should be given in construction to light and air, and not alone, as at present, to the prevention of fire, as sunlight and fresh air are very essential to good sanitary conditions.

During this examination a large number of buildings was found with such defects, and in the case of old buildings changes were called for under the law, chapter 419, Acts of 1892, which is still in force; but in the case of new and fireproof buildings we found that where we called for the insertion of glass instead of wood panels in the doors to provide light to halls, that it conflicted with the building law and the owner was obliged to replace the wood panels.

The Board of Health is of opinion that some change in the existing building law should be made so that good light and ventilation shall be provided for all halls, stairways, bedrooms and water-closet rooms in every tenement house hereafter constructed.

REMOVAL OF OLD BUILDINGS.

This law, which was passed in 1897, and amended in 1899, confers a power on the Board of Health which should be used only with the greatest care and consideration. In consequence of its recognition of this great power, the Board has been very conservative in its application of the law, and while subject to some criticism on account of not moving more rapidly, feels satisfied that this was the wisest and safest course to pursue in the application of a law which gives such absolute power.

In addition to this feeling of responsibility and conservatism, during the past year there have been a number of reasons why there has not been so much of this work done as during the preceding years. Since the passage of the law a suit for injunction was brought in November, 1900, against the Board of Health to restrain it from removing several old and dilapidated buildings and sheds, used as stables, on Ward street, and this is still pending. Notwithstanding the fact that the sum of ten thousand dollars was asked for in the annual estimate for the department, not a dollar was allowed for this specific purpose, nor has a dollar been appropriated for this purpose since the passage of the law. In all other large cities in this and older countries, this work has been accomplished by the appropriation of large sums of money, and the work has been done on an extensive scale by the destruction of numerous buildings in very congested districts, and by the laying out of broad thoroughfares and the building of new and sanitary dwellings, which can be rented at reasonable rates. There are a number of these congested districts in this city where improvements of this kind could be made to great advantage; such, for instance, as Webster avenue from Hanover street to Unity street, which could be widened and made a street instead of remaining as it is, a narrow alley, thus doing away with a lot of unsanitary dwellings and improving all the others. Another great improvement could be made by the extension of Hale street, formerly Crescent place, to South Margin street, doing away with a number of old, unsanitary houses, and the laying-out of this street would also necessi-

tate the building of a public sewer, which at present is drained by two imperfect common drains at either end of the street, discharging one into the Norman-street sewer and the other into the Pitts-street sewer. These two drains run under the buildings at the lower end of the street, and are a constant source of trouble and nuisance.

SMALL-POX.

Small-pox has prevailed in Boston to a greater extent the present season than at any other time since the winter of 1872-3, when, during about eight months from September to May, more than 1,000 deaths occurred from this disease. It was during this time that the City Board of Health was appointed and took charge of the Health Department. Previous to this time, or from 1840 to 1873, inclusive, there occurred in Boston 2,943 deaths from small-pox, an annual average of 89.33. From 1874 to 1900, inclusive (twenty-seven years) there occurred but sixty-three deaths, an annual average of 2.33. During these twenty-seven years of comparative relief from small-pox, physicians and the people became more or less negligent of vaccination, and few physicians have become sufficiently familiar with the disease to recognize it, especially in a mild form. With the exception of a little flurry of small-pox in 1894, when a moderate amount of voluntary vaccination was secured, this prophylactic measure has been but moderately used. The beginning of, the headway gained, and the persistency with which small-pox has maintained itself for a few months this winter have been due to unusual and difficult conditions to overcome. First: The larger portion of the people were in a receptive condition for the disease. Second: A large number of the cases were so mild as not to restrain the victim in the pursuit of his duties or to occasion any suspicion on his part or on the part of anybody else as to the character of the disease, until a nest or a scattered crop of serious cases had been occasioned, and reported to the Board of Health. Third: An unprecedented slowness in reporting cases of a suspicious and doubtful appearance.

This disease appeared in a very mild form in a large factory in May. It was not recognized until several severe cases had resulted. It was then reported to the Board of Health, and within forty-eight hours twelve cases were found

and removed to the hospital. This outbreak was soon ended, but another and another occurred in different parts of the city. All known cases were quickly picked up and cared for in the hospital and all necessary precautions put in use. In spite of the measures taken, cases increased to 12 in August, to 30 in September, to 49 in October, to 195 in November, to 201 in December, and 177 in January.

In October it became evident that more hospital accommodations would be required, and the Board hastily equipped extra buildings at Gallop's Island, to which a portion of the patients have been sent since November 16.

Total number of cases, February 1, 1901, to February 1, 1902, including a few cases from adjoining cities and towns (401 males and 280 females)	681
Number admitted to Small-pox hospital,	
Southampton street	544
Number admitted to Gallop's Island	132
Number left at home (too ill to be removed),	5
	— 681
Total number of deaths was 108 (62 males and 46 females) or 15.85 per cent.	
Number of deaths at Gallop's Island	28
Number of deaths at Small-pox Hospital,	
Southampton street	76
Number of deaths at home	4
	— 108
Number showing any evidences of vaccination	292
Number showing no evidences of vaccination	389
	— 681
Number of deaths among vaccinated	27
Number of deaths among unvaccinated	81
	— 108
Percentage of deaths among vaccinated	9.24
Percentage of deaths among unvaccinated,	20.82

The type of the disease at the beginning of the outbreak was uncommonly mild, but it increased in severity later on. The number of cases is now diminishing, and there is every reason to believe that it will go on diminishing from this time. Mild and unrecognized cases will undoubtedly be a source of trouble for many months to come, and cases will

undoubtedly reach the city by rail from other places where the disease is prevalent.

VACCINATION.

The office for public vaccination in the City Charity Building on Chardon street has been open daily, Sundays and July 1 to September 1 excepted, throughout the year, where 12,180 persons have been vaccinated by the city. Beginning November 13, temporary offices for free vaccination were opened from six to eight o'clock in the evening for a few weeks at a time in several sections of the city where the largest number of cases of small-pox were found. Letters were sent to railroad companies, mercantile and other establishments recommending the free vaccination of all employés. The people in general were advised through the daily papers to protect themselves from small-pox by vaccination. Under these several methods of suggestion by the Board of Health a ready and generous response was made by the people, and a very large percentage of the inhabitants secured vaccination. There were then left a few who, for one reason or another, neglected or refused to be vaccinated, and on December 26 the Board issued its order for the vaccination of all the inhabitants of the city. On January 2 the Board began sending physicians into portions of the city where most needed to give free vaccination in the homes and places of business, and to take the names of those who refused to be vaccinated, and who were also within the provisions of said order. East Boston, South Boston, Charlestown, the North End and West End, and a portion of Roxbury and Dorchester were thus visited, and vaccinated if willing to be vaccinated, and those who refused were given a short time in which to change their minds, and then, if necessary, were summoned to court. The larger number of these cases secured vaccination. The number prosecuted was nineteen. The total number vaccinated during the year by this department is 185,000. The number vaccinated by family physicians and by other agencies is estimated at about 300,000.

WET LANDS AND STAGNANT POOLS OF WATER AS BREEDING PLACES FOR MOSQUITOES.

It has been conclusively shown that certain kinds of mosquitoes are necessary intermediate factors in communicating

malaria from one person to another. It is also well known that the mosquito is absolutely dependent upon comparatively stagnant water for the propagation of its species. Stagnant water may be drawn off, or its surface sprinkled once in two weeks with kerosene oil to destroy the necessary conditions for the breeding of mosquitoes. With these facts in view this department is bound to regard the existence of stagnant pools of water and continued wet surfaces of land as a danger to the public health, and a condition which demands more decisive treatment than it has received heretofore. Considerable work in draining land was accomplished last season, and the work will be vigorously renewed the coming season.

STONY BROOK.

There are still well-grounded complaints against the foul condition of Stony brook. This offensive condition can be arrested only by building public sewers for the use of habitations and business places along the banks of the brook. The foul waters of this stream flow into the water basins of the Back Bay Fens, where it settles and continues to be a cause of offence and complaint. The Board respectfully urges the City Council to consider means of preventing the fouling of this brook.

HOSPITAL FOR CONSUMPTIVES.

The Board of Health regrets to say that it has not been able to accomplish as much in the way of diminishing the prevalence of or suffering from consumption during the past year as it could have done had it possessed the advantage of a convenient and sufficient hospital for cases in the advanced stages of the disease. Patients in the advanced stages of consumption are frequently found in such impoverished condition as to be unable to supply themselves with the necessary food, medicines, clothing and ordinary comforts. The shelter and general condition of these patients are often found to be of the worst sort. Such patients are not hopeful, and sanitary instructions cannot be enforced. Consumptives in an indigent state, with the disease well advanced, are not only a constant source of danger to the community, but are themselves objects of pity, requiring protection and the aid of public charity. They cannot, as infectious cases, lawfully be sent to Tewksbury, and the city has no adequate

provision for them. Private charity cares for some, and there are 67 (47 for men and 20 for women) beds for consumptives at Long Island; but the city needs at once a suitable plant for this class of infectious and charity patients, with a capacity of 300 beds. The Board of Health respectfully urges the importance of this upon the attention of the City Council.

GARBAGE PLANT.

This plant is situated at Cow Pasture on Dorchester Bay; is the property of the New England Sanitary Product Company, and is constructed and operated on what is known as the reduction method. It was put in operation November, 1898, was soon complained of by the people living within a radius of more than two miles, was carefully investigated by the Board of Health and declared to be a public nuisance. The same experience and declaration were repeated in 1901. All effort on the part of the Board of Health to secure action of any kind against the New England Sanitary Product Company, either under its contract with the city or on the merits of the case in court, have been negatived by the city government, and the powers of the Board of Health to fight this public nuisance, for the time being, have been made void. This plant has been a well-known public nuisance from the time it was put into use to the present day, and has thus far appeared to defy all efforts of the said company to stop the nuisance, which appears to be the result of an inherent power for offence in the reduction process, of which this plant is an example. The plant is now to be moved from its present location, where it is so bitterly complained of, to another on Spectacle Island, where it will be placed between and within a few hundred feet of two other very offensive plants, one for rendering dead animals, bones, grease etc., and the other for the manufacture of glue.

Its new location is also within a few hundred feet of the main ship channel, through which millions of persons pass to and from the city every season.

CITY MORGUE.

After more than a half century of service the old wooden building on North Grove street, known as the City Morgue, erected about the year 1850 and renovated and enlarged in 1879, was, on May 22, 1901, abandoned and dismantled, and

immediately thereafter, removed. Upon a portion of its site and adjacent land there has been erected a substantial and commodious building of brick, 22 feet front and 42 feet deep, three stories in height. The old morgue, which was but one story in height, covered 1,140 square feet. With its limited area and meagre equipment, it long ago ceased to meet the requirements which the modern morgue demands, and in fact, became so dilapidated and far beyond the possibility of repair, that it was a positive discredit to the City of Boston. The new morgue has every device and convenience which scientific and utilitarian considerations demand. There are reception, identification, waiting and storage rooms, a columbarium with twelve receptacles for dead bodies, refrigerated by means of an ammonia plant, operated by electricity, an autopsy room of ample dimensions with seats for students arranged in amphitheatre, an operating table which is connected with a ventilation shaft running to and through the roof, controlled by electric fans, and every known essential to a perfectly equipped morgue. The building is practically fireproof, and its walls, floors and stairways are of non-combustible material. An electric elevator runs from basement to second floor.

DISINFECTING DEPARTMENT.

For many years the disinfection department has been ill-provided for, inasmuch as quarters for the superintendent and his assistants and storage rooms for supplies have been situated in old sheds located upon the yard of the Street Department at the rear of the morgue, while the horses have been boarded at a stable some distance away. During the year there was erected and equipped a building adjacent to the morgue, with a frontage of 64 feet and a depth of 42 feet, containing on the ground floor ample space for the housing of the department wagons and carriages, on the second floor an office for the superintendent, waiting rooms for the employes, harness room, and a stable with ten single stalls and one box stall. On the third floor storage rooms for hay and grain, and a room especially designed for the care of disinfectants and department supplies generally, also a bed-room and bath for night attendants. An electric elevator of sufficient capacity runs from basement to third floor. An office is also provided on the ground floor for the superintendent of pedlars. The morgue and disinfection department buildings are practically one, with a frontage of 86 feet and a depth of 42 feet, covering 3,612 square feet of land.

STABLES.

Since March 8, 1889, no new stables have been occupied, nor increase of animals allowed in any stables, without a written permit from the Board of Health. It has been the constant effort of the Board to lessen the objections to stables by improving the drainage and ventilation and particularly by changing the old method of storing manure, which has been one of the chief objections to stables. In the opinion of the Board, storing manure in pits is a nuisance, its removal an unwarrantable annoyance to the neighborhood and an unnecessary expense to the owner. In the place of a pit, the Board now requires, in the larger stables, a cart to be so placed as to receive the manure directly from the floors, and in the small stables barrels with suitable covers are allowed.

These innovations from old customs were not accepted without objections; and much time and trouble has been expended in convincing mechanics, as well as owners, that their interests were in harmony with these changes. Many of those who saw great objections to the new method now cheerfully admit the very great advantage to their carriages as well as cleanliness and economy in the handling of manure.

When it is decided by the Board to grant an application for the occupancy of a stable, it issues the following notice:

STABLE NOTICE.

CONDITIONAL PROMISE OF STABLE PERMIT.

HEALTH DEPARTMENT, BOSTON,

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To _____

DEAR SIR, — After the stable has been erected at _____

and all the conditions herewith imposed have been complied with — *and not until then* — I am authorized by the Board of Health to issue a permit for its occupancy by _____ horses. Cows.

CONDITIONS.

The use of manure pits in connection with stables is prohibited. There shall be no manure kept or stored in connection with the stable except in a cart so placed as to receive said manure, to be removed as soon as the cart is full, or in tight barrels or small receptacles approved by the Board of Health.

All floors shall be substantial and tight.

The air space shall be equal to one thousand cubic feet for each animal.

The ventilating, lighting and draining of the stable must be satisfactory to the Board of Health.

The erection of a stable must be begun within ninety days from the date hereof (if not already erected) and prosecuted to completion.

The position of the stable must be in strict accordance with the plan on file in this office.

Before proceeding to build a stable it will be necessary to apply to the Building Commissioner for a *permit to build*, to whom you should show this notice.

The stable must not be occupied until after all the above requirements have been complied with and reported upon by an officer of this department, and a written permission for its occupation has been issued by this Board.

By direction of the Board of Health,

Secretary.

When the stable is finished and the requirements fully complied with, a permit for occupancy is given.

EXAMINATION OF PLUMBERS.

The Board of Examiners of Plumbers has continued its weekly examinations of applicants for licenses through the year, with no unusual experience to report. The following is from the report of the secretary of the Board of Examiners: Sixty candidates have been examined for master plumber's licenses, and 166 for journeymen's. Of these 38 have been granted masters' licenses, and 82 journeymen's, while master's licenses have been refused to 26 and journeymen's to 84, on account of their failure to pass satisfactory examinations.

EXAMINATION OF GAS-FITTERS.

The Board of Examiners of Gas Fitters has continued its weekly examination of applicants for licenses during the year without anything to note as different from the experiences of other years. The following is from the report of the secretary to the examining board:

Number of applications for licenses referred by Building Commissioner to Board of Examiners	285
Number of examinations held	43
Number of applicants examined by Board	202
Masters	101
Journeymen	101
Number of applicants examined, certified by Board to Building Commissioner for license	45
Masters	26
Journeymen	19
Number of examination papers rejected, applicant not receiving requisite percentage	157
Masters	75
Journeymen	82

By the above statement it will be seen that the per cent.

passing the masters' examination was 25, while but 18 per cent. passed the journeymen's examination.

BARBER SHOPS.

The regulation for barber shops promulgated by this department in May, 1900, has been enforced with reasonably good results. Some of the barber shops were all right at the time; many needed extensive changes, which were made to conform to our regulations; other shops needing radical changes, and failing to receive them, were discontinued.

MEDICAL INSPECTION OF SCHOOLS.

TABULATION OF REPORTS OF MEDICAL INSPECTORS OF SCHOOLS AND AGENTS OF THE BOARD OF HEALTH, FOR THE YEAR 1901.

List of Diseases found in the Schools.

I. — SPECIFIC INFECTIOUS DISEASES.		3. Tonsils.	
Diphtheria.....	9	Acute follicular tonsillitis..	1,045
Scarlet fever.....	9	Hypertrophic tonsillitis....	384
Measles.....	25	Abscess.....	0
Whooping-cough.....	78		
Mumps.....	111	4. Uvula.	
Chicken-pox.....	100	Elongation.....	4
Influenza.....	32		
Tuberculosis.....	4	5. Nose.	
Malaria.....	11	Acute rhinitis.....	29
	379	Chronic rhinitis.....	11
		Purulent rhinitis.....	3
		Ozaena.....	3
		Deviations of Septum.....	1
		Epistaxis.....	17
II. — DISEASES OF THE ORAL AND RESPIRATORY TRACT.			
		6. Naso-Pharynx.	
1. Mouth.		Naso-pharyngitis (Post-nasal catarrh).....	27
Stomatitis:		Adenoid disease.....	89
(a) Simple (erythematous),	10		
(b) Aphthous (herpetic)...	0	7. Larynx.	
(c) Ulcerative.....	2	Acute laryngitis.....	27
(d) Parasitic (thrush, etc.),	0	Chronic laryngitis.....	3
Alveolar abscess.....	28		
		8. Bronchi.	
2. Pharynx.		Acute bronchitis.....	150
Acute pharyngitis.....	388	Chronic bronchitis.....	3
Hypertrophic pharyngitis (acute and chronic).....	74		2,293

NOTE. — In further diagnosis the nomenclature of Osler's Practice of Medicine is recommended.

III.—DISEASES OF THE EAR.

Foreign bodies (cerumen, etc.).....	2
Otitis media, catarrhal, acute.....	37
Otitis media, catarrhal, chronic.....	6
Otitis media, suppurative, acute.....	19
Otitis media, suppurative, chronic.....	34
Mastoiditis.....	0
Imperfect hearing (without visible cause).....	39
	<hr/> 137

IV.—DISEASES OF THE EYE.

1. Foreign bodies.....	14
2. <i>Eyelids.</i>	
Blepharitis.....	33
Stye.....	16
Ptosis.....	0
Trichiasis.....	0
3. <i>Lachrymal Organs.</i>	
Obstruction of duct.....	0
Abscess.....	0
4. <i>Conjunctiva.</i>	
Conjunctivitis:	
(a) Acute catarrhal.....	204
(b) Purulent.....	12
(c) Phlyctenular.....	1
(d) Granular.....	36
5. <i>Cornea.</i>	
Interstitial keratitis.....	3
Ulcer.....	5
Opacity.....	8
6. <i>Iris.</i>	
Iritis.....	3
Synechia.....	0
7. <i>Muscles.</i>	
Strabismus.....	9
Nystagmus.....	0
Paralysis of extra-ocular muscles.....	0
Imperfect sight (without visible cause).....	187
	<hr/> 531

V.—DISEASES OF THE SKIN.

Acne.....	32
Alopecia areata.....	3
Dermatitis.....	67
Eczema.....	323
Erythema multiforme.....	2
Erythema simplex.....	24
Furunculus.....	32
Herpes { simplex.....	92
{ zoster.....	4
Impetigo contagiosa.....	155
Pediculosis.....	1,929
Pemphigus.....	4
Pityriasis maculata et circinata.....	6
Pruritus.....	2
Psoriasis.....	7
Purpura.....	0
Scabies.....	48
Seborrhoea.....	15
{ favosa.....	17
{ trichophytina.....	74
{ versicolor.....	0
Urticaria.....	42
Verruca.....	5
	<hr/> 2,883

VI.—MISCELLANEOUS DISEASES.

Anæmia.....	183
Debility.....	119
Headache (habitual).....	146
Cervical adenitis.....	130
Chorea.....	9
Ulcer.....	41
Deformities, spinal extremities.....	10
Sprains.....	25
Fractures.....	3
Contusions.....	42
Wounds.....	88
Abscess.....	48
Dental caries (painful).....	23
Neuralgia.....	16
Epilepsy.....	4
Rheumatism.....	21
Cardiac diseases.....	9
Gastric diseases.....	150
Intestinal diseases.....	19
Urinary diseases.....	6
Vaccinations (performed)...	6,320
Certificates of vaccination...	2,663
Unclassified.....	84

10,159

SUMMARY.

Specific infectious diseases	379
Oral and respiratory diseases	2,293
Diseases of the ear	137
Diseases of the eye	531
Diseases of the skin	2,883
Miscellaneous diseases	10,159
Found free from disease	2,426

Total	18,808
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*Examined for Vaccination Marks.**

Satisfactory marks found	34,319
No marks found	2,282

Total	36,601
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Number of pupils examined in the schools	55,409
Number recommended to be sent home	3,647
Number consultations with teachers (about pupils re- turning to school, etc.)	4,289

Following is a list containing the names of the Medical Inspectors of schools:

MEDICAL INSPECTORS OF SCHOOLS.

- J. L. Ames, 72 Chestnut street, Brimmer School, Kindergarten, Parochial, Fayette-street School.
- S. H. Ayer, 318 Shawmut avenue, Franklin, Waite, Cook, Parochial, Cathedral, German Parochial.
- W. B. Bancroft, 597 Broadway, Hart, Capen, Bird, Parochial, Kindergarten.
- David N. Blakely, 200 Warren street, Mt. Pleasant avenue, Yeoman, Dearborn, Eustis street.
- W. S. Boardman, 57 Hancock street, Eliot, Ware, Freeman, Parmenter, North Bennet Kindergarten.
- J. P. Broidrick, 67 South street, J. P., West Roxbury High, Creighton street, Leo XIII. Parochial.
- J. S. Brownrigg, 16 Delle avenue, Parochial, Kindergarten.
- J. E. Butler, 310 Warren street, George Putnam, St. Joseph's Parochial, St. Francis' Parochial.
- A. B. Coffin, 555 Washington, Dorchester High, school in store on Washington street, Gibson on School street, Gibson on Morse street, Atherton, Glenway Primary, Glenway Kindergarten.

* One child in every fifteen not vaccinated.

- R. M. Cole, 456 Broadway, Shurtleff, Lincoln, Clinch and Burnham.
- D. A. Collins, 11 Parmenter street, St. Mary's Parochial, St. Stephen's Parochial, Moon-street Public.
- W. P. Coués, 90 Charles street, Wells, Winchell, Poplar street, North Russell street, Chambers-street Primary and Chambers-street Kindergarten.
- M. J. Cronin, 470 Warren street, Comins and Martin.
- J. T. Cutler, 20 Crawford street, Edward Everett, Harbor View, Savin Hill and Athenæum.
- J. G. Dearborn, 2 Wood street, Charlestown, Harvard, Harvard Primary and Common-street Primary.
- John Duff, 4 Dexter row, Warren, Mead street, Cross street and Charlestown High.
- D. G. Eldredge, 15 Monadnock street, Mather, Quincy-street Primary.
- Wm. H. Ensworth, 7 Chelsea street, E. B. Adams, Plummer Primary and Assumption Parochial schools.
- Theo. C. Erb, 551 Columbus avenue, Everett, Dwight, Rutland, Concord, Joshua Bates.
- Wm. E. Fay, 290 Commonwealth avenue, Hyde, Sherwin, Leon-street Branch, Parker-street Branch, Day Nursery.
- Wm. H. Grainger, 408 Meridian street, Chapman, Tappan, Parochial.
- E. M. Greene, 20 Mt. Vernon street, Bowdoin, Somerset, Sharp, Phillips, Grant, Baldwin on Chardon street.
- J. S. Greene, 1107 Washington street, Dor., Gilbert Stuart, Morton-street Primary, Stoughton, Tileston, Adams-street Primary.
- Lyman G. Haskell, 335 Centre street, Jamaica Plain, J. P. Lowell, Wyman street, Lucretia Crocker, Heath street, Centre street, Sunnyside street, Baptist chapel.
- F. A. Higgins, 22 Marlboro' street, Quincy, Winthrop, Primary, Way street; Primary, Genesee street; Primary, Tyler street; Dennison Kindergarten.
- F. C. Jillson, Hastings street, W. Roxbury, Robert G. Shaw, Mt. Vernon street, Baker street.
- J. S. H. Leard, 16 Weld Hill street, Agassiz, F. H. Primary, Margaret Fuller, Primary, Bowditch, Hillside Primary, Chestnut avenue.
- Francis Magurn, 112 Main street, Charlestown, Frothingham and Moulton-street Primary.
- H. E. Marion, 5 Sparhawk street, Brighton High, Bennett Grammar and Annex, Winship Primary, Union-street Primary and Kindergarten.
- O. H. Marion, 22 Harvard avenue, Harvard, Everett, Allston, Webster.

- Wm. J. McNally, 31 Monument square, Prescott, Medford-street Primary, Polk-street Primary.
- R. M. Merrick, 15 Adams street, Harris school, Dorchester-avenue Primary, Henry L. Pierce, Thetford-avenue Primary, Lauriat-avenue Kindergarten.
- G. P. Morris, 702 Broadway, Andrew Ticknor, Roger Clap.
- T. J. Murphy, 372 Dudley street, Hugh O'Brien, George-street Primary, Howard avenue, St. Patrick's Parochial.
- J. F. O'Brien, 401 Bunker Hill street, Bunker Hill Grammar, Parochial.
- E. F. O'Shea, 5 Chelsea street, E B., Lyman, High, Cudworth, Fitton.
- W. H. Parker, 1773 Dorchester avenue, Minot, Bailey-street Primary, and the Henry L. Pierce.
- H. J. Perry, 171 Massachusetts avenue, Roxbury High, Lewis Grammar, Primary, Quincy street; Primary, Monroe street; Primary, Winthrop street; Primary and Kindergarten, Warren street.
- J. C. D. Pigeon, 130 Warren street, Dudley, Dillaway.
- H. L. Plummer, 728 Saratoga street, Emerson, Noble, Chapel on Bennington, Blackinton, and Star of the Sea.
- H. S. Rowen, Bennett street, Bennett, Oak-square Primary, Warren Grammar, Faneuil Primary, St. Joseph's Academy, Allston, Auburn Primary.
- J. H. Sherman, 534 Broadway, Bigelow, Hawes, Simonds.
- C. M. Smith, 15 Charles street, Horace Mann, Prince, Perkins.
- Henry B. Stevens, 79 Park street, Longfellow, Charles Sumner.
- F. W. Stuart, 550 Broadway, Norcross, Cyrus Alger, Drake.
- W. F. Temple, 240 Huntington avenue, Rice, Boys' Latin, Boys' High, Girls' Latin, Girls' High.
- H. F. R. Watts, 372 Dorchester, Gaston, Tuckerman, Pope, Kindergarten.
- Francis J. Weller, 580 Broadway, Lawrence, Mather, Howe, Parochial.
- Franklin W. White, 416 Marlboro' street, Hancock, Cushman, Parmenter-street Kindergarten, Sheafe street and Moon street.

CULTURE STATIONS.

Outfits for *diphtheria*, *typhoid*, *tuberculosis* and *glanders* may be obtained at any of the following stations. Outfits for other bacterial examinations and for *malaria* will be mailed on request by telephone (1145 Haymarket) or by letter to the laboratory.

Diphtheria, tuberculosis and glanders preparations may be returned to the culture stations for transmission to the laboratory. *Typhoid* and *malaria* preparations must be forwarded by mail.

Laboratory,	Sudbury and Hawkins sts.,	City.
Baker, Chester	Mass. ave. and Boylston st.,	"
Canning, Henry	57 Chambers street,	"
Colley, Frank	610 Tremont street,	"
Connelly's Pharmacy,	146 Harrison avenue,	"
Countie, C. J.	25 Charles street,	"
French & Corner	1759 Washington street,	"
Malley, G. H.	113 Cambridge street,	"
Metcalf, Theo.	Copley square,	"
Metcalf, Theo.	39 Tremont street,	"
Pratt, Fred L.	575 Columbus avenue,	"
Sheppard, S. A. D.	Dover and Washington sts.,	"
Tilton, A. W.	71 Prince street,	"
Tilton, A. W.	Hanover and Parmenter sts.,	"
Wheeler, W. D.	Mass. ave. and Beacon st.,	"
Downey & McCormick	Thompson square,	Charlestown.
Draper, William	Sullivan square,	"
Clark & Mahoney	101 Saratoga street,	East Boston.
Brackett, C. L.	Heath and Bromley streets,	Roxbury.
Cramer, Max	1212 Columbus avenue,	"
Gavin, A. L.	Warren and Regent streets,	"
Walker, G. W.	648 Warren street,	"
Reid, T. T.	3101 Washington street,	"
Sawyer, W. F.	1152 Tremont street,	"
Somers, M. W.	210 Blue Hill avenue,	"
Alexander, G. H.	100 Dorchester street,	South Boston.
Flynn, C. P.	Dorch. ave. and Dorch. st.,	"
Jones, J. T.	855 Fourth street,	"
Joyce, Thomas	141 West Broadway,	"
Archer, Fred W.	1181 Washington street,	Dorchester.
Connolly & Davis	1442 Dorchester avenue,	"
Connolly & Davis	760 Washington street,	"
Connolly & Davis	64 Walnut street, Neponset,	"
Copley, A. H.	45 Hancock street,	"
Perry & Co.	Corbet and Norfolk streets,	"
Tessier Bros.	Dorch. and Savin Hill aves.,	"
Tripp, A. H.	573 Talbot avenue,	"
Ernst, Frank O.	186 Lamartine street,	Jamaica Plain.
Ernst, Frank O.	281 Centre street,	"
Rogers, C. B.	701 Centre street,	"
Jeffers, S. T.	728 South street,	Roslindale.
Swallow, F. O.	1904 Centre street,	West Roxbury.
Moore, S. W.	377 Cambridge street,	Allston.
Warren, G. W.	348 Washington street,	Brighton.

UNDERTAKERS.

Appointed annually by the Board of Health in accordance with the Revised Laws of Massachusetts.

LIST OF UNDERTAKERS, CITY OF BOSTON.

Abrams, Barnett, 4 Williams-street terrace, Roxbury.
 Alexander, Alexis, 100 Wayland street, Dorchester.
 Alexander, J. H., 610 Fifth street, South Boston.
 Avdon, Samuel, 60 Salem street, Boston.

Badaracco, Andrew A., 11 North Bennet street, Boston.
Balfe, Thomas J., 258 Broadway, South Boston.
Banks, Walden, 80 Sawyer street, Boston.
Barry, Michael, 371 Harrison avenue, Boston.
Barry, William, 371 Harrison avenue, Boston.
Belgard, Philip, 15 Arnold street, Roxbury.
Bernstein, Morris H., 26 Parmenter street, Boston.
Brady, Patrick J., 3694 Washington street.
Briggs, Frederick L., 20 Howard street, Boston.
Brown, Edward G., 232 Meridian street, East Boston.
Brown, Frank E., 252 Meridian street, East Boston.
Bryant, Chas. A., 2 Woodstock avenue, Brighton.
Bryant, John E., 15 Austin street, Charlestown.
Bryant, T. Weston, 15 Austin street, Charlestown.
Burke, Edmund C., opp. Jamaica Plain station.
Burke, John B., 75 Chambers street, Boston.
Burke, Richard J., 42 Bunker Hill street.
Burroughs, Samuel M., 110 Dorchester street, South Boston.
Callahan, Timothy F., 52 Warren street, Charlestown.
Cangiano, Michael, 212 North street, Boston.
Carpenter, Geo. S., 251 Tremont street, Boston.
Caro, Solomon M., 19 Catawba street, Roxbury.
Casey, Francis P., 56 Warren street, Roxbury.
Cassidy, William J., 120 Harrison avenue, Boston.
Celler, Gustave, 34 Hammond street, Boston.
Chester, Charles E., Trinity Church, Boston.
Cleary, J. P., 5 Pynchon street, Roxbury.
Cobb, Charles W., 99 Main street, Charlestown.
Cobb, Frank L., 97 Hyde Park avenue, Jamaica Plain.
Cobe, William, 18 Worthington street, Roxbury.
Colbert, Charles E., 144 Harrison avenue, Boston.
Cole, Harry H., 9 Hancock street, Dorchester.
Connell, Austin H., 815 Albany street, Roxbury.
Crane, F. E., 565 Tremont street, Boston.
Crane, Horace R., 25 Walnut street and 1859 Dorchester avenue, Dorchester.
Crogan, James P., 87 Chelsea street, Charlestown.
Crosby, Elizabeth A., 10 Warren street, Roxbury.
Crosby, Joseph P., 100 Hampden street, Roxbury.
Curtis, David H., 397 Dudley street, Boston.
Dacey, C. M., 82 Main street, Charlestown.
Dalzell, Fred W., Egleston square, Boston.
Dolan, Chas. B., Dorchester avenue, cor. Richmond street.
Dolan, James W., 1880 Dorchester avenue, Dorchester.
Dooley, David J., 147 London street, East Boston.

Doolin, John, 211 Third street and 245 Dorchester street, South Boston.

Downes, A. A., room 11, Old Court House.

Doyle, Thomas, 2212 Washington street, Roxbury.

Eastman, Alman L., 251 Tremont street, Boston.

Fallon, John D., 736 Centre street, Jamaica Plain.

Farrell, Michael A., 1336 Tremont street, Boston.

Feeley, Thomas, 128 Freeport street, Dorchester.

Feeney, John, 364 Hanover street, Boston.

Field, George V., 214 Dorchester street, South Boston.

Field, Geo. P., 214 Dorchester street, South Boston.

Fitzgibbon, Edward D., 1345 Dorchester avenue, Dorchester.

Flax, Harris, 3½ Barton street, Boston.

Gallivan, Joseph C., 317 Broadway, South Boston.

Galvin, John I., Long Island.

Gilmore, Edward J., 1455 Tremont street, Boston.

Gleason, E. F., 345 Washington street, Dorchester.

Gleason, R., 345 Washington street, Dorchester.

Grace, Charles Henry, 211 Bunker Hill street.

Guggenheim, Joseph, 111 West Brookline street, Boston.

Haynes, John O., sexton Emanuel Church, Newbury street.

Hill, George, South street, Roslindale.

Hogue, Alphonse, 10 Isabella street, Boston.

Hutchins, Basil, 726 Shawmut avenue, Boston.

Jacobovitz, Myer, Centre street, West Roxbury.

Jacobs, Louis, 110, Pleasant street, Boston.

Jones, Lewis L., 50 La Grange street, Boston.

Keating, Thomas J., 322 Bunker Hill street, Charlestown.

Kelly, Bernard, 310 Bowdoin street, Dorchester.

Kelly, Michael J., 37 Maverick square, East Boston.

Lane, Thomas J., 120 Havre street, East Boston.

Langone, Joseph A., 218 North street, Boston.

Lavery, Frank W., 54 A street, South Boston.

Lavery, John W., 54 A street, South Boston.

Leary, Lewis W., 146 Broadway, South Boston.

Linnehan, C. P., 98 Kneeland street, Boston.

Lippa, William, 19 Stillman street, Boston.

Maloney, Frank S., 123 Maverick street, East Boston.

Mann, Lewis A., 145 Dudley street, Roxbury.

Marsh, W. W., 475 Cambridge street, Brighton.

Mannheimer, Herman, 1623 Washington street, Boston.

McCaffrey, Christopher P., 75 Albany street, Boston.

McCaffrey, John, 75 Albany street, Boston.

McCartney, Timothy, 328 Bunker Hill street, Charlestown.

McCugh, Hugh, 4278 Washington street, Roslindale.

McMakin, Bernard S., 80 Bunker Hill street, Charlestown.

Metcalf, Eugene H., 24 Franklin street, Allston.
Mitchell, M. J., 324 Franklin street, Charlestown.
Morris, Jerome S., 165 London street, East Boston.
Morris, John J., cor. London and Porter streets, East Boston.
Morris, Lawrence F., cor. London and Porter streets.
Muldoon, Joseph L., Market street, Brighton.
Mullen, James, 84 Charlestown street, Boston.
Mullen, M. J., 650 Broadway, South Boston.
Mullen, Patrick H., 650 Broadway, South Boston.
Murdock, James E., 2048 Washington street, Roxbury.
Murphy, Michael J., 428 Hanover street, Boston.
Murray, E. A., 29 Thacher street, Boston.
Murray, Frank A., 29 Thacher street, Boston.
Nolan, John E., 380 Broadway, South Boston.
O'Donnell, James F., 204 Broadway, South Boston.
Peak, John H., 1374 Washington street, Boston.
Peak, John H., Jr., 1374 Washington street, Boston.
Peyser, Jacob, 39 Hammond street.
Porchella, Michael J., 37 Tileston street.
Rafferty, Patrick H., 60 Chambers street, Boston.
Rafferty, Thomas E., 1034 Tremont street, Boston.
Reade, George E., 263 Dover street, Boston.
Reade, Vincent de P., 187 Main street, Charlestown.
Reade, Vincent de P. Jr., 187 Main street, Charlestown.
Regan, Martin, 1032 Tremont street, Roxbury.
Ring, Timothy F., 205 D street, South Boston.
Roach, Edward E., 191 Pyncheon street, Roxbury.
Roeder, John R., Henshaw street, Brighton.
Roles, Roswell, 730 Shawmut avenue, Roxbury.
Ruemker, Frank H., 296 Roxbury street, Roxbury.
Silverstein, Myer L., 238 Hanover street, Boston.
Slyne, William F., 249 Dorchester street.
Smith, Prescilla M., 106 Dorchester street.
Spencer, W. F., 408 Broadway, South Boston.
Sprague, John W., 120 Meridian street, East Boston.
Stanetsky, Jacob, 13 Wiget street, Boston.
Stokes, Waldo J., Park street, West Roxbury.
Sullivan, J. F., 358 Market street, Brighton.
Sullivan, Samuel J., 545 Harrison avenue, Boston.
Sullivan, T. J., 332 Broadway, South Boston.
Tinkham, Charles F., 20 Howard street, Boston.
Tinkham, Jeremiah, 20 Howard street, Boston.
Tondorf, Joseph B., 129 Shawmut avenue, Boston.
Vinal, Frederick, Deer Island.
Walsh, John F., 91 Chelsea street, Charlestown.
Waterman, Frank S., 2326 Washington street, Roxbury.

Waterman, George H., 2326 Washington street, Roxbury.
Watson, Bernard L., 52 Warren street, Roxbury.
White, Harry M., 728 Dudley street, Roxbury.
Whitman, Lewis H., 399 Cambridge street, Boston.
Willard, George A., 110 Dorchester street, South Boston.
Williams, N. M., 1386 Washington street, Boston.
Wittenberg, Solomon, 66 Salem street, Boston.

APPOINTMENTS.

The Board organized on the first Monday in May by the choice of Samuel H. Durgin, M.D., as chairman, and Chas. E. Davis, Jr., as secretary.

February 4, William M. Gay, M.D., was appointed assistant port physician in place of Dr. Green, whose resignation was received to take effect on the 16th of February.

September 3, Michael J. Cronin, M.D., was appointed one of the medical inspectors of schools in place of Dr. E. M. Holden, resigned.

September 25, H. J. Perry, M.D., was appointed one of the medical inspectors of schools in place of Dr. H. D. Arnold, resigned.

November 25, Irving R. Bancroft, M.D., was appointed resident physician at the Small-pox hospital on Southampton street.

January 8, 1902, W. H. Parker, M.D., was appointed one of the medical inspectors of schools in place of Dr. Dewey, resigned.

SAMUEL H. DURGIN, *Chairman*
EDWIN L. PILSBURY.
ROBERT COX.

FINANCIAL STATEMENT.

EXPENDED TO JANUARY 31, 1902.

Board of Health	\$12,500 00
Clerk-hire	10,368 28
Messenger	657 61
Inspector of Nuisances . .	28,167 92
Inspector at Abattoir . .	1,461 40
Medical officers	7,433 33
Disinfection	20,806 82
Small-pox hospital . . .	12,053 95
Medical inspection of schools,	9,851 00
Vaccination	19,376 62
Laboratory	10,434 47
Nuisances	770 20
Morgue	381 43
Postage	393 00
Telephones	753 58
Travelling expenses — officers,	1,975 91
Office expenses	1,766 23
Horse and vehicle — Board	
of Health and Medical	
Inspectors	3,674 19
Stationery	408 86
Printing	5,526 03
Advertising	290 03
Examination of plumbing	
and gas-fitters	550 00
Inspection of milk and vinegar,	11,066 73
Inspection of provisions .	2,962 04
Superintendent of pedlers .	2,232 36
Demolition of buildings .	241 00
Other contagious diseases .	5 50
Quarantine, sundries and	
port physician	3,513 29
Quarantine, Gallop's Island .	22,652 38
“ steamer Vigilant,	9,438 14

\$201,712 30

INCOME.

Quarantine	\$6,498 00
Inspection of milk and vinegar,	609 00
Other sources	300 00
Total	<u>\$7,407 00</u>

NUMBER OF PERSONS PERMANENTLY EMPLOYED IN THE HEALTH DEPARTMENT.

Board of Health, 1 at.....	\$4,500 00
" " 2 at.....	4,000 00
Clerk-hire, 1 at.....	3,000 00
" 1 at.....	1,800 00
" 1 at.....	1,700 00
" 1 at.....	1,600 00
" 1 at.....	800 00
" 2 stenographers, each at.....	624 00
Medical Officers, 1 at.....	2,500 00
" " 1 at.....	2,400 00
" " 1 at.....	2,100 00
" " 1 at.....	500 00
Inspectors of Nuisances, 1 at.....	2,300 00
" " 5 at.....	1,800 00
" " 2 at.....	1,700 00
" " 3 at.....	1,600 00
" " 1 at.....	1,400 00
" " 1 at.....	1,300 00
" " 4 at.....	1,200 00
" " 1 at.....	850 00
Police Officers, 4 at.....	1,200 00
Disinfecting Corps, 1 at.....	1,800 00
" " 18 at (per diem).....	2 25
Inspectors of Provisions, 1 at.....	1,600 00
" " 1 at.....	900 00
Inspector at Abattoir, 1 at.....	1,400 00
" of Pedlars, 1 at.....	1,300 00
" " 1 at (per diem).....	3 00
Small-pox Hospital, Superintendent, 1 at.....	600 00
" " Matron.....	300 00
Messenger, 1 at.....	260 00
Bureau of Milk Inspection, 1 at.....	3,000 00
" " " 1 at.....	2,400 00
" " " 1 at.....	1,500 00
" " " 3 at (per diem).....	3 00
Quarantine, Port Physician, 1 at.....	1,500 00
" Assistant Physician, 1 at.....	1,000 00
" Captain, 1 at.....	1,500 00
" Engineer, 1 at.....	1,200 00
" Mate (monthly).....	75 00
" Assistant Engineer (monthly).....	60 00
" Steward (monthly).....	65 00
" Deck hand, 1 at (monthly).....	45 00
" Fireman, 1 at (monthly).....	45 00
" Overseer of Island (monthly).....	60 00
" Farmer, 1 at (monthly).....	30 00
" " ".....	25 00
" Laborer, " ".....	25 00
" Matron, " ".....	25 00
" Nurse, " (weekly).....	12 00
" Cook, " (monthly).....	16 00
" Laundress, 1 at (monthly).....	18 00
Morgue, Superintendent of, 1 at (annual).....	360 00
Laboratory, Superintendent, 1 at.....	3,000 00
" Assistant Superintendent, 1 at.....	1,300 00
" Stenographer, 1 at (weekly).....	15 00
" Clerk, 1 at (weekly).....	13 00
" Messenger, 1 at ".....	3 00
" " ".....	5 00

INVENTORY OF PROPERTY IN CHARGE OF THE
BOARD OF HEALTH.

Office No. 11 Old Court House, office furniture and records.
Bacteriological Laboratory, 607 Sudbury Building, furniture and scientific equipment.

Small-pox Hospital, Southampton street —

One building used as a hospital.

One building used as a disinfecting plant.

One building for quarantining suspected cases of rabies in dogs.

Milk Inspection, office and laboratory at 30 Huntington avenue, with chemical apparatus for the examination of milk and vinegar.

Old Morgue, North Grove street.

New Morgue, North Grove street, unfinished and unfurnished.

Disinfecting building in North Grove street, for the storage of disinfectants — 12 horses, 5 wagons, 3 ambulances, 2 vans, 5 pungs, 1 undertaker's wagon and 44 regenerators.

Quarantine steamer "Vigilant," with equipment.

Gallop's Island, with the following buildings, etc. :

Rag-shed for the disinfection of rags.

4 polling-booths

2 detention-houses.

1 bath-house.

Small-pox hospital.

Yellow fever hospital.

Overseer's house.

Barn.

Laboratory.

Carpenter shop.

Blacksmith shop.

2 wagons.

Ambulance.

Farming, carpenter and blacksmith tools.

2 horses.

3 cows.

REPORT OF DIRECTOR OF BACTERIOLOGICAL LABORATORY.

To the Board of Health :

GENTLEMEN, — I have the honor to submit the following report for the year ending January 31, 1902.

The laboratory routine and methods are first described, together with notes on the application and interpretation of the laboratory results in practice, and the outline of a system for genealogical record of cultures, designed by B. R. Rickards, assistant bacteriologist.

Thereafter are given the results of certain investigations conducted under general instructions from the Board of Health, or under special instructions in particular cases. These investigations related to (1) the morphology of *B. diphtheriæ*, (2) the sanitary condition of the Boston ice supply, (3) public laundries, (4) clam digging in the Mystic River, (5) the possibility of typhoid infection through cooked oysters and clams, (6) a case of ptomaine poisoning, (7) candy-making, (8) arsenic in paint used for public school blackboards, (9) other matters, such as diphtheria bacilli in well persons, the brown tail moth, malarial and other mosquitoes, etc. An appendix follows, summarizing the routine work.

FIRST PART.

LABORATORY ROUTINE.

Hours for receiving Specimens. — Specimens are received at the laboratory daily throughout the year from 8.30 A.M. to 6 P.M., except on Sundays and legal holidays, when the hours are from 8.30 A.M. to 10 A.M., and from 1.30 P.M. to 6 P.M.

Hours for Examinations. — The laboratory is open for examination of specimens from 8.30 A.M. to 5 P.M., except that on Saturdays the closing hour is 12 M., and on Sundays and legal holidays 10 A.M.

Swab and Five-Hour Examination in cases of Suspected Diphtheria. — When requested, the laboratory is ready at all times during examination hours (ordinarily 8.30 A.M. to 5

P.M.; on Saturdays, 8.30 A.M. to 12 M.; on Sundays and holidays, 9 A.M. to 10 A.M.) to examine the *swabs* themselves from cases for *diagnosis*. It has been found that in about one-half of the cases finally proving positive after the ordinary incubation a positive diagnosis can be made from the swab without waiting for incubation, thus saving from fifteen to twenty-four hours. A negative result from the swab is unreliable. In such cases, if the culture has been brought into the laboratory before 12 M., a *five-hour incubation* may be given, and reported on at 5 P.M., except on Saturdays, Sundays and holidays. A negative result from this examination also is unreliable, and the regular overnight incubation must then be proceeded with.

Positive results from the swab, the five-hour or the overnight incubation are equally reliable.

Transmission of Specimens. — Outfits for specimens from *Tuberculosis*, *Diphtheria*, *Typhoid* and *Glanders* are kept at certain drug stores appointed for the purpose, and known as "culture stations." (See page 56.) *Malaria* outfits are supplied from the laboratory only. After the specimen is collected, it may be taken or sent directly to the laboratory. If preferred, specimens from cases of *Tuberculosis*, *Diphtheria*, and *Glanders* may be returned to the station from which the outfits were obtained. They must not be mailed under any circumstances. If received at the culture station early enough to reach the laboratory before 6 P.M., they are forwarded free to the laboratory the same day. *Typhoid* and *Malaria* specimens should not be left at the stations, but should be sent directly to the laboratory by mail. If special examinations are required the specimens should be sent by special messenger at the physician's expense.

Reports. — Early reports from the specimens submitted are of importance chiefly in the diphtheria diagnostic work. Everything else is subordinated to obtaining these results quickly. All positives for diagnosis, and all doubtful or unsatisfactory results where a second examination may be desirable, are reported to the physician by telephone when possible. Negative results for diagnosis, and cultures for release are not reported by telephone, except upon request. All results are reported to physicians by mail, whether telephoned or not.

The diphtheria results are usually available by 10 A.M., sputum and typhoid results by 11 A.M., and other examinations by 12 M. Telephone inquiries should not be made before these hours.

Persons Eligible for Examination. — Boston physicians may send cultures from patients resident within or outside

of Boston. Physicians resident outside of Boston may send cultures from patients resident in Boston. When both physician and patient reside outside of Boston the cultures should be sent to the State Board of Health.

Horses Eligible for Examination. — Boston veterinarians may send preparations from horses whose owners are resident either within or outside of Boston. Veterinarians resident outside of Boston may send preparations from horses, the owners of which reside in Boston, or from horses stabled or working in Boston, although their owners are non-residents. If the veterinarian resides outside of Boston, and the horse is stabled and works outside of Boston, preparations may be sent if the owner is a resident of Boston. Otherwise the preparations should go to the State Board of Agriculture, Cattle Department.

METHODS OF EXAMINATION AND INTERPRETATION OF RESULTS.

Tuberculosis.

Outfits. — For suspected tubercular sputum, square wide-mouth bottles of about half an ounce capacity are supplied, contained in a pasteboard box and accompanied by a paper form, with directions on one side, and on the other, blank spaces to be filled out by the physician with particulars of the case. To prevent infection of the laboratory from sputum, each bottle is sent out half filled with 5 per cent. carbolic acid solution. The sputum is deposited in this solution and remains there until it is examined. The carbolic acid not only kills the bacilli but also acts upon them as a mordant, improving their staining qualities. On receipt of the outfit at the laboratory the cover of the box is taken off and the whole outfit exposed to the vapor of formalin over night in a tight receptacle with the object of killing any bacilli scattered during the process of collection over the outside of the cork or bottle, etc.

No bottle containing sputum will be received for examination if leakage from the bottle during transit has occurred.

If the examination of urine for *B. tuberculosis* is desired, it is best to send to the laboratory the whole amount passed in 24 hours. Special precautions should be taken to prevent contamination with smegma or other foreign matter.

Examination. — The sputum specimens are examined usually on the morning following receipt.

Briefly, the examination consists in smearing the sputum upon a glass slide or coverslip, drying, staining with hot

carbol-fuchsin, washing, decolorizing with a solution consisting of 3 per cent. of hydrochloric acid in 95 per cent. alcohol, washing again and counterstaining with methylene blue in aqueous solution. *B. tuberculosis* is stained red by this process, most other organisms blue or not at all. An apparatus has been designed by B. R. Rickards, assistant bacteriologist, for staining large numbers of specimens at once. This was described and figured in the annual report of 1900.

The Interpretation of Bacteriological Findings in the Diagnosis of Tuberculosis.

Positive Results.—It is probable that very occasionally a few tubercle bacilli may be found in the mouths of healthy persons, but persons suffering from any affection of the lungs, larynx, etc., and presenting also the tubercle bacillus in their expectoration may safely be considered as suffering from the disease. It is not unlikely that very occasionally non-virulent bacilli resembling tubercle bacilli in appearance, staining reactions, etc., may be present in sputum; in such cases a guinea-pig test is necessary for differentiation. In smegma such an organism is not rare, and this should be taken into account when collecting or examining material likely to be contaminated with smegma.

Negative Results.—A single negative result does not demonstrate the absence of the bacilli from the particular specimen of sputum examined, nor, if that absence be confirmed by subsequent examinations of successive specimens, is the absence of the disease necessarily established. A negative result from a patient suffering from consumption may depend on (a) improper collection of specimen, saliva being taken instead of true pulmonary expectoration (ordinarily the saliva of a patient whose sputum contains the bacilli will be infected, but the numbers will usually be relatively small); (b) the presence of but few bacilli in the sputum—the microscopic examination being unreliable for the detection of very small numbers; (c) the absence of the bacilli from the sputum notwithstanding the presence of the disease. This latter is to be expected when there is little or no breaking down of the lung tissue, as in early stages of chronic consumption, and sometimes throughout the course of acute miliary tuberculosis.

A clinical diagnosis of tuberculosis, pulmonary or genito-urinary, should not be reversed upon a single negative result. The errors described under (a and b) may be eliminated by repeated examination, but it is a question whether even a

dozen negative sputum examinations should be allowed to offset well-marked clinical indications in such cases as are given under (c).

In certain cases, injection of guinea pigs is necessary to reach a final decision, but the results are then available only after four to twelve weeks.

Diphtheria.

Outfits.— One serum tube, one swab tube containing two swabs, a card to be filled out by the physician with the particulars of the case, and a paper giving directions, are enclosed in a pasteboard slide box, which is disinfected in formaldehyde gas each time before being sent out. Before taking an outfit from a culture station the serum should be inspected, and if dry or bad rejected. *For diagnosis*, one swab *may* be used for the nose and one for the throat, both being inoculated on the same serum tube. *For release*, this procedure *is required* by a regulation of the Board of Health. If it is desired to obtain *for diagnosis* separate results from the nose and the throat, two outfits should be used, the nose swab being inoculated on one serum, the throat swab on the other, but nothing is gained by taking *separate* nose and throat cultures *for release*. When a rapid or swab examination for diagnosis is contemplated, it is well to rub the swab on the suspected area in the nose or throat a second time *after* the inoculation of the serum. The swab is then returned directly to the swab tube. This procedure increases the reliability of the swab results by increasing the amount of material made available for examination.

Incubation.— All diphtheria cultures received up to 6 P.M. are placed in the incubator at 37°C over night for examination at 8.30 A.M. the next day. Should a culture be delayed beyond the time of closing, it may at times be well to remember the procedure followed by Gehrmann of Chicago. The tube, well stoppered, is placed in a pocket of the robe worn at night and is thus incubated at body temperature. Placing the tube over a radiator or near a stove is comparatively unsatisfactory.

Release.— By a regulation of the Board of Health, two consecutive negative cultures from both the throat and nose are required from each case reported as diphtheria before isolation is officially terminated and disinfection performed. In all cases the second of these cultures must be taken by the medical agent of the district in which the patient resides.

When the first negative for release is obtained the proper

medical agent is notified by telephone from the Board of Health (Old Court House) to take a culture. Should this prove negative it constitutes the required second negative, and the patient is then released.

Should the agent's culture be positive, as it is in a large number of the positive cases, a first negative must again be obtained and be followed by a second negative, in order to secure the two *consecutive* negatives required.

The Interpretation of Bacteriological Findings in the Diagnosis of Diphtheria.—The most satisfactory definitions and nomenclature of bacterial diseases are based, not on clinical characteristics merely, but on both the *presence* and *activity* of specific bacterial toxins—those poisons formed only by the specific bacteria of the disease in question. *Under this conception the disease of diphtheria exists always, and exists only, when the body shows a reaction to toxins formed by the diphtheria bacillus.* Bacterial diseases are in brief toxicological diseases, due to poisoning by chemical compounds of a peculiar kind—just as are the chronic diseases caused by lead, arsenic, etc., or acute attacks due to morphine, strychnine, etc. A clinical condition known to be due to the action of lead, whether mild or severe, and whatever the particular symptoms shown, is properly classified as plumbism. So also a clinical condition, due to diphtheria toxins, whether mild or severe, and whatever the particular symptoms shown, is properly classed as diphtheria. This classification is not only theoretically correct, but is very practical, from the therapeutic standpoint, as indicating the proper treatment and also the sequelæ and complications to be expected, and from the public health standpoint as indicating the nature and infectiveness of the disease. A merely clinical classification, based on anatomical features alone, cannot be relied on to indicate any one of these important features. Unfortunately there is no generally applicable and reliable method for detecting *both* the *presence* and *activity* of diphtheria toxins.

The detection of the diphtheria bacillus is used as an indicator of the *presence* of the diphtheria toxins. It is not absolutely reliable, for the diphtheria bacillus does not always produce its toxins. But even the presence of the toxins (if determined by subsequent guinea-pig tests) does not necessarily indicate their actual *activity* in the patient. The body forces tend to neutralize these toxins, and sometimes neutralize them completely. If the patient presents symptoms clearly those of diphtheria poisoning, both the presence of the toxins and their activity may be inferred. If the symptoms are indefinite, the presence of the diphtheria bacillus

may be assumed to show the presence of diphtheria toxins; and the existence of symptoms, indefinite though they be, may be assumed to result from the activity of the toxins. It is true that diagnoses based on these assumptions are not always correct, but the percentage of error is much smaller than that of unaided clinical diagnosis. (See also p. 102.)

If the person from whom a positive culture is obtained presents no symptoms of any kind, either the absence of the toxins or their complete neutralization — it does not matter which, so far as the patient is concerned — may be inferred. Such a person certainly is not suffering from the *disease* of diphtheria. But so long as diphtheria bacilli remain in his nose or throat he constitutes a nucleus from which the bacilli may be distributed to others.

The absence of the diphtheria bacillus is, on the other hand, absolute proof of the absence of the disease, since diphtheria toxins are not found except in the presence of diphtheria bacilli.¹ The difficulty lies in proving absolutely that the bacilli are, in fact, absent. If absent from the nose and throat they will not, of course, appear in the cultures therefrom. But even when present in the nose or throat they do not always appear in culture — that is, if only one culture be taken. Indeed, two or three, or even four, negative cultures may occasionally be taken from throats carrying the bacilli. This is especially true of pure laryngeal cases where the seat of lesion is not readily reached. Hence, while one negative culture is of some value, two, three or four, should be taken in suspicious cases before rejecting a clinical diagnosis of diphtheria on the bacteriological results alone.

No Growth. — This is a laboratory term used to designate any culture which for any reason (usually because the serum is too dry or has been liquified by contaminating bacteria) does not yield material satisfactory for examination.

A Negative Report, accompanied by a request for Another Culture is sent whenever a negative result is obtained from a case clinically diphtheria (as indicated by the physician's diagnosis) or from a case showing membrane on pharynx and tonsils, or from a laryngeal case, or from a case yielding bacilli of doubtful identity.

Tests for Virulence. — These are made on request in cases where patients recovered from diphtheria are kept in isolation for extended periods on account of diphtheria bacilli in the nose or throat. If the bacilli prove non-virulent, release is granted without waiting for two consecutive negatives. (See also Annual Report, 1900.)

¹ Laboratory experiments with toxins are not here included.

Typhoid Fever.

The dried-blood method for the Widal reaction is used.

Outfit. — This consists of aluminum foil, on which the blood is to be dried, and a small copper wire loop for transferring the blood to the foil. With this foil is a card, to be filled out by the physician, and a circular of directions. All three fit into a manila envelope for safe keeping. After the physician has taken the blood preparation it is returned to the laboratory by mail, postage two cents.

Examination. — The dried blood is mixed on the foil with ten times as much sterile water; a drop of this dilution is mixed on a coverslip with a drop of broth containing typhoid bacilli, making a total dilution of one in twenty. This preparation, mounted as a "hanging drop," is observed at intervals under the microscope for from thirty minutes to one hour. If loss of motility only, or clumping only, occurs, the preparation is called atypical, and another requested. If both occur, a positive, and if neither, a negative report is sent. A new typhoid culture on agar, reaction + 10 (1.0 per cent. acid) is made every day from a previous agar culture one month old. This insures that there shall always be an agar culture one month old in the laboratory. From this month-old agar a broth culture also (+ 10 initial reaction) is made every day, and is ready for use next day after incubation for twenty-four hours at 37° C.

Interpretation of Results of Widal Test in Typhoid Fever
Diagnosis. — The Widal reaction occurs in the blood as one of the results of the reaction of the body forces to the toxins of the typhoid bacillus. It may be obtained from rabbit's blood within three or four days after injecting the rabbit with living or dead typhoid bacilli. In such rabbits the reaction is not necessarily or usually associated with the lesions, intestinal or otherwise, characteristic of typhoid fever in the human. Nor is it essential that the human patient should have the ordinary symptoms, or lesions, of intestinal typhoid fever in order to develop a reaction. It is sufficient that the human patient should suffer from the effects of the typhoid bacillus toxins, whatever clinical or anatomical conditions may accompany them. Moreover, once developed, the reaction may last for years after recovery, although usually it disappears within a few months. The presence of the reaction in the human means then the existence at some time past or present of an infection with the typhoid bacillus (Cabot) — usually, but not necessarily, an infection taking the form of ordinary intestinal typhoid fever.

To interpret a positive report properly the physician must know whether such a previous infection existed, and how long before, if at all. If there is a clear and reliable history of freedom from anything resembling typhoid fever previous to the attack, it may be usually assumed with safety that no previous typhoid infection existed, and that the Widal reaction obtained developed during the present attack. One source of error lies in the fact that reliable histories regarding typhoid fever cannot always be obtained, and that in any case a slight or obscure typhoid infection, other than intestinal, might have existed without recognition as "typhoid."

A negative Widal reaction is of little or no significance. The Widal reaction does not develop in the human before the fifth day usually, may not develop until late in the disease, and is not constantly present after development, so that a negative result may be interposed between two positives. It is easy to see that a patient might have typhoid fever and with it the Widal reaction present on certain days of the attack and yet that, by a coincidence, all the blood for the test might be taken on "off" days,—days on which no Widal reaction could be obtained. While this *possibility* should be remembered, it is not *likely* to be encountered if several successive specimens be taken. *An atypical reaction* means nothing. The subsequent reactions may be positive or negative.

Malaria.

Outfit.—This consists of a small flat tin box, which contains half-a-dozen clean coverslips wrapped in paper. On application to the laboratory, one such box, accompanied by a circular of directions and a card to be filled out with the particulars of the case by the physician, is mailed to the address given. The outfit should be returned to the laboratory by mail.

Examination.—Upon receipt of the coverslips, with the blood smeared on them as directed, the examination is carried out. The greatest care should be exercised to obtain a *thin even smear of blood upon the coverslip*. Better and more satisfactory results can be obtained by the examination of *fresh undried* blood. The physician places a *small* drop of blood on a slide, quickly drops a coverslip upon it, and at once seals the coverslip to the side with a little vaseline carefully applied to the whole circumference of the coverslip. This preparation must be taken to the laboratory at once by a careful person, who is directed not to disturb it in any way.

Glanders.

This work is done largely by Dr. Alexander Burr, veterinarian to the Board.

Outfit. — This consists of a cylindrical copper box containing an eight-inch test tube, a card for particulars of the case and a circular of directions. The test tube contains a large swab of a design similar to that used for the diphtheria work. The outfits are sterilized each time before being sent out. The object to be sought by the veterinarian is the accumulation in the cotton of as much as possible of the suspected material from the nasal discharge or ulcers of the suspected horse.

Examination. — On receipt of an outfit at the laboratory the swab is transferred to five c.c.'s of sterilized water and shaken thoroughly in it. The resulting suspension is inoculated intra-abdominally into well-grown male guinea-pigs, and a positive or negative diagnosis is usually based upon the development or non-development of testicular lesions within seven days, after further examination of the testes, when enlarged, for the isolation of the organism.

Interpretation of Results of Guinea-Pig Test. — See Annual Reports, 1899, 1900.

Mallein.

This diagnostic agent is made in the laboratory for the use of the Board of Health in testing horses for glanders. It is supplied free to veterinarians also for the same purpose. The methods of preparation and use and the interpretation of the results are given in the annual report of 1900.

Rabies.

Collection of Specimen. — Dogs or other animals suspected of rabies should not be killed, but should be confined securely, and notification sent to the veterinarian of the Board of Health. If the animal is dead the whole carcass should be preserved, and notification sent as above. Failing this the head at least should be kept for examination.

Examination. — Rabies is examined for by injecting under the dura (exposed by trephining) of a full-grown rabbit one half a c.c. of an emulsion consisting of about one gram of the brain or spinal cord from the suspected animal in ten c.c.'s of sterile water, filtered through absorbent cotton and paper. The trephine hole is just posterior to a line joining the centres of the eyes. Paralysis or convulsions developing

after fourteen days, followed by death, is good evidence of the presence of rabies, if other infections can be excluded by a careful autopsy of the rabbit, with cultures from blood and organs. Two rabbits at least should be inoculated with the same material in each case.

Rapid or Histological Method.— See Annual Report, 1900.

Influenza.

Influenza is examined for by direct staining of nasal or bronchial discharges, and by cultures from these regions and from the blood on glycerine agar, on the surface of which sterile human or pigeon's blood has been smeared. Sputum, etc., for examination, should be sent to the laboratory in small sterile wide-mouthed bottles, properly stoppered and labelled.

Other Examinations.

Any disease of a bacteriological nature will be examined for free of charge. Before collecting specimens from diseases other than those already enumerated, communication should be had with the laboratory.

Preparation of Media.

See previous reports.

Determination of Formaldehyde in Solution (Formalin); Romijn's Method. (Sutton, 1900, page 393).

Ten cubic centimeters of the formalin to be tested are diluted to one liter with distilled water; ten cubic centimeters of this solution are then mixed with twenty-five cubic centimeters of deci-normal iodine solution, and sodium hydrate is added, drop by drop, until the liquid becomes a pale yellow. After ten minutes hydrochloric acid is added to liberate the uncombined iodine. Standard sodium thiosulphate is then added until the iodine color has nearly disappeared. The solution is then titrated the end point, using starch solution as the indicator.

Determination of Available Chlorine in Chloride of Lime; Penot's Method. (Sutton, page 186.)

Solutions.— Approximately tenth-normal solutions of iodine and arsenious acid solutions are prepared and standardized against pure arsenious acid.

Preparation of Sample.— The sample of chloride of lime to be tested is first thoroughly mixed, then 7.17 grams are

accurately weighed out, put into a mortar, triturated with successive small portions of water until thoroughly ground and conveyed to a liter graduated flask without loss. The flask is then filled to the graduation mark with water, stoppered, thoroughly shaken, and 50 c.c. of the well-mixed contents measured out accurately for analysis.

Procedure.—The arsenious acid solution is added in excess to the solution to be tested, and the excess is determined by titrating back with standard iodine solution. The residual number of cubic centimeters of arsenious acid solution shows directly the percentage of available chlorine.

Arsenic in Fabrics.—The well-known Marsh process is used to detect arsenic in fabrics.¹

A System of Recording Cultures of Bacteria Genealogically for Laboratory Purposes. By Burt Ransom Richards, S.B., Assistant Bacteriologist.

The system here given furnishes a convenient means of recording all data relating to the study of individual laboratory cultures of bacteria. It was devised originally for keeping a record of the stock cultures. As it served its purpose in that field very satisfactorily, it has been elaborated from time to time to meet further needs until it has reached its present form.

The writer's system is an adaptation of the Dewey Decimal System of Classification,² the method of use being such as is easily remembered.

Every species of bacteria, upon becoming a member of the laboratory stock, is given a number in the hundreds. Thus:

<i>B. coli communis</i>	100	<i>B. mallei</i>	400
<i>B. typhi abdominalis</i>	200	<i>B. prodigiosus</i>	500
<i>B. diphtheria</i>	300	<i>B. pestis bubonicæ</i>	600

Individual specimens of any one species, coming from different sources, are numbered in the order of their isolation or reception with the units from 1-49. Thus:

<i>B. mallei</i> from one horse	401
" " a second horse	402
" " a different lesion in the second horse	403
" " same lesion at a different time	404
" " a third horse	405

The first culture of *B. mallei* isolated would be 401.1.

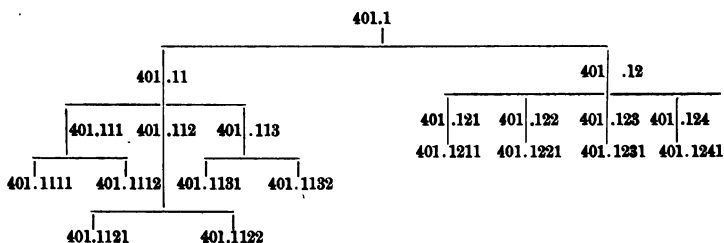
¹For a detailed description of this process see the Report of the Massachusetts State Board of Health, 1900.

²Decimal Classification and Relativ Index. M. Dewey.

A sub- (or daughter¹) culture from this original culture would be 401.11.

A sub- (or daughter¹) culture from this second culture would be 401.111, and so on — each *sub*-culture bearing the number of the mother culture from which it was taken, with one figure more placed one space more to the right of the decimal point. If but one sub-culture is made, this added figure is always one. If more than one sub-culture is made the first of these sister cultures is designated as above (the number of the mother culture with one in the next right decimal place), the second by two in the same place of decimals, etc., *i.e.*, 401.11, 401.12, 401.13, etc.

This may be better illustrated by a graphical sketch :



(It will be seen from the above that a single daughter culture is always expressed by the number of the mother culture with the figure 1 placed in the next right place of decimals, and that further cultures made from the same given mother culture are expressed by increasing this last new figure in arithmetical order. This is the key to the system.)

If at any time more than nine sister cultures be made from any one culture, the figures above nine are enclosed in brackets to avoid confusion, *e.g.*, 404.18, 404.19, 404.1 (10), 404.1 (11), etc.

In cases where the numbers have become somewhat unwieldy, they may often be abbreviated by using exponents, *e.g.* 401.1111121113 = 401.1⁵²¹⁸³.

When an *unidentified* organism is *isolated*, it is given the specific number in hundreds which designates the species which it most resembles, but with the tens and units figures running above 50; thus, a glanders-like organism would be numbered 451, etc., pending its further examination. If

¹ For the sake of convenience and clearness, the following terms have been adopted in this article:

Mother culture. — The culture from which another culture is inoculated.

Daughter culture. — The sub-culture from the mother culture.

Sister cultures. — Two or more cultures made from the same mother culture.

(Obviously the terms are relative. It is evident that any one culture may be a mother, a daughter, and a sister culture at the same time.)

found to be glanders, it would be renumbered below 450, taking the number next above that of the glanders culture last isolated.

Unidentified organisms having no striking resemblance to any species possessed by the laboratory are classed by themselves under one species number (*e.g.*, 10,000), until identified.

A card system is used in connection with this system of numbering, offering a complete record.

Upon the first form of card record is made of all cultures of each species at the time of inoculation, including the history of the culture up to isolation and the number of each further culture, the date of inoculation, the media upon which the culture is grown, etc.

Animals are regarded as one form of culture media and receive a number, based on this system, just as if each animal were a tube of medium. Cultures made from different organs of the same animal are regarded as sister cultures. The name of the organ from which each individual culture came is entered in a column headed "Remarks."

In cases where only nine or ten inoculations of media are necessary, the first card will contain the entire history of the work done. An extension card, printed with the same forms of culture record ruling may be used when more than this number of cultures is to be recorded.

In any case where the results of an inoculation are too extensive to be satisfactorily stated on the culture record card, a blank card is used for this purpose. Such a card is identified by the number of the culture which it describes. A note referring to this card should be made in the "Remarks" column of the culture record card.

The culture record, extension, and supplementary cards are filed together.

Animal inoculations. — In cases where animal inoculations are made, a special card is used. This card is filled out as far as possible at the time of inoculation with the particulars of the inoculation.

A rude sketch of the color markings of the animal is made on the outline in the lower left-hand corner of the card, which serves as a means of identification. The card is then hung, by means of a small clasp, directly upon the cage of the animal. It is thus conveniently at hand for the recording of symptoms, etc. After the autopsy of an animal the information given on the animal card may be transferred to the culture record or supplementary card. The animal card can then either be destroyed or filed separately.

The media card contains all information relating to the

making of the media, such as the amounts of the various ingredients, the titrations, etc. The media cards are filed by themselves.

Label writing. — The culture number written on a culture tube is all that is necessary to completely identify that culture. Considerable time is thus saved in label writing. Other points, such as date of inoculation, medium used, etc., may be added if desired, but they are not essential since this culture number on the tube indicates directly (1) the species (by the number in the hundreds), (2) the particular member of the species (by the number in the tens and units), (3) the generation of the culture (by the number of places to the right of the decimal point), (4) the culture from which it was inoculated (by the number as a whole minus the figure in the last place of decimals), and this number also indicates indirectly by reference to the culture cards (5) all further information relating to the culture, *i.e.*, the source, date of inoculation, the medium, the lot of medium, and, in general, all previous history.

Remarks. — The card system has the usual advantages of cross-reference, convenience and elasticity. By having a system of cards for media (including animals), and for cultures before and after isolation of the organism, one has a complete record conveniently at hand.

The criticism may be made that the system is complex. This is true, but it should be remembered that the facts which it aims to record are complex. In many cases, where so complete a record as that provided for is not necessary, it can be considerably modified. On the other hand, it can easily be elaborated and extended to meet conditions not here specified. For instance, species may be designated by numbers in the thousands instead of in the hundreds (*e.g.*, *B. coli*, 1000, *B. typhi abdominalis*, 2000, etc.), if a larger number of different specimens of the same species are to be recorded.

The card forms described are in use in the bacteriological laboratory of the Boston Board of Health. Cards for the special purposes of other laboratories will probably suggest themselves. Those bacteriologists engaged in the differentiation and classification of species may find useful cards printed somewhat after the style of the Fuller-Johnson* table and designed to record the variation in reaction of different species or different specimens of the same species upon some one medium.

This card system is not offered in any sense as an alternative or substitute for the Fuller-Johnson method of

*Transac. Am. Pub. Health Assn., 1899.

tabulating final results of species work, but rather as an orderly and systematic method of accumulating the data from which such tables may finally be constructed.

SECOND PART.

NOTES ON THE MORPHOLOGY OF *B. diphtheriæ*.

The importance of the theoretical and practical questions depending for their solution on an intimate acquaintance with the morphology of *B. diphtheriæ* has of late stimulated bacteriologists, especially those connected with public health work, to further investigations. This revival is due largely to Wesbrook's publication¹ in 1889 of his nineteen morphological types, and such advance in these lines as has since been made, in this country at least, is due directly or indirectly to him.

The writer, believing that bacterial morphology as a whole, and the morphology of the diphtheria bacillus in particular, require investigation by the most radical and direct methods if evidence of final value is to be hoped for, devised a method * for the examination of the bacilli while developing which, although but a modification of previous methods, seems to remove many of the difficulties inherent in the latter and to place the whole process on a more practical working basis. The use of this method permits the ready appreciation of what the writer believes to be an important point in morphology, first brought forward by Nakanishi,² as well as the determination by actual observation of certain points heretofore matters of speculation. Although these questions have been discussed briefly elsewhere³ it has been thought well to review the main points here and to outline certain hypotheses which the latter seem to justify.

The species known as *B. diphtheriæ* has for a long time been known to present certain morphological peculiarities differentiating it sharply from other species. The differences in morphology between *B. diphtheriæ* and other species are

* The technique consists briefly in substituting for the ordinary "hanging drop" of liquid or jelly a cube of solidified agar, on the surface of which the bacteria are distributed. The inoculated surface of this cube is applied to the under surface of the coverslip, and for convenience is known then as the "hanging block." Oxygen probably reaches the bacteria by diffusion through the block or the seal—certainly aerobic bacteria like *B. diphtheriæ*, *B. typhosus*, etc., grow readily in such a preparation. For anaerobes, it is sufficient to expose the block to the action of pyrogallol. This method is applicable, as the hanging liquid drop is not, to motile as well as to non-motile forms. It is better than either of the older methods on optical grounds, because the bacteria present in a given preparation cannot lie otherwise than horizontally and in the same plane. They are all necessarily in optical contact with the coverslip and are free to grow (horizontally) without the restrictions imposed by surrounding them with jelly or the freedom to drift allowed if liquid be used. For motility, the liquid hanging drop is of course necessary, but there is probably no other feature of the living individual which cannot be studied in "hanging block" preparations to advantage. (See Jour. Med. Research, March, 1902.)

more striking than the differences in morphology existing amongst these other species themselves. It has been proposed indeed by various writers at various times to remove *B. diphtheriæ* from the class bacilli since it has seemed not sufficiently like the other bacilli to justify its retention with them. Such proposals have usually been based it is true on the fact that *B. diphtheriæ* often presents branching. Recently accumulated proof that branching exists in bacilli differing less strikingly than does *B. diphtheriæ* from the usual characteristics of the bacillus group has appealed to various writers as making such a change, on the basis of branching alone, seem as yet inadvisable. That such a change may be advisable on other grounds is not yet disproved.

Briefly, the striking peculiarities which *B. diphtheriæ* presents when compared, for instance, with such a "typical" bacillus as *B. typhosus*, are —

- (1.) The variations in size and outline found amongst individuals from the same culture, and even amongst the descendants of the same individual. (Plate I.)
- (2.) The marked tendency to variations in staining reactions found amongst individuals from the same culture, the peculiarities of staining having nevertheless a certain definiteness and symmetry in the individual.
- (3.) Certain details of the fission processes.
- (4.) The well-known tendency of individuals to arrange themselves in positions at an angle with each other, and also in groups, the individuals of which are approximately parallel.
- (5.) The processes by which the individuals separate from each other after fission and arrive at the angular and parallel positions noted.
- (6.) The frequency of branching.

It is true that irregularities of outline, wide variations in diameter and in length, variations in staining reactions, and angular as well as parallel arrangements occur in *B. typhosus*, but the irregularities in outline, size, and staining are comparatively slight in extent, while the angular and parallel positions are achieved in a totally different way. Branching in *B. typhosus* has not yet been recorded, although Ohlmacher⁴ claims that he has found true branching in a close ally (*B. coli*). Even so, it is yet to be shown that the branching in *B. diphtheriæ* is identical with that found in other species.

The peculiarities of *B. diphtheriæ* in outline and staining

reactions have been elaborated by various writers, but most comprehensively by Wesbrook.¹ Certain peculiarities of *B. diphtheriæ* relating to fission, angular position and branching, are reviewed here with some additions resulting from recent work.

The Post-fission Movements of B. diphtheriæ.

(Plate I.)

Restricting the term fission to the separation of the protoplasm of the bacterium into two portions, each capable of further growth, development and reproduction, a striking difference as regards fission between *B. diphtheriæ* and its allies on one hand, and *B. typhosus* (taken for this purpose as a type of a large group distinct from the diphtheroid group) on the other, lies in the post-fission movements. It may at times be possible to detect in *B. diphtheriæ* segmentation of the protoplasm previous to the post-fission movements, a hard dark line, not necessarily central, developing across the axis of the rod; sometimes more than one such segmentation line is visible in a single rod. What may usually be observed is a gradual enlargement of the bacterial cell in both diameters accompanied often by slight changes in outline suggesting some plasticity of the bacterial walls; then a sudden snapping across of the rod resulting in the two portions lying at an angle with each other, and suggesting for such organisms the convenient term, "snapping group." Subsequent growth results in the gradual approximation of the distal ends of these two rods to each other, giving a parallel arrangement. The proximal ends of the new rods (those which before the snapping were continuous with each other) remain contiguous to each other after parallelism is achieved.

In such movements, one or both rods necessarily describe parts of a circle, and when, as often happens, the two rods are not of the same length, the shorter usually moves through a much greater arc than the longer. Subsequent growth does not usually result in the separation of the two portions at the proximal ends, the increase in length in the larger portion apparently carrying the other portion with it. That something unites the proximal ends seems further evident, because if two rods thus derived be disturbed, as by a current of water, so that they drift off, turning over and over, their relative positions remain unaltered. A single rod may break up into three portions instead of two.

The hypothesis offered by the writer to explain these movements is, in brief, as follows: that the visible bacterial

rod is surrounded by an invisible or scarcely visible membrane (even in crowded unstained preparations, individuals lying side by side are rarely if ever in visible contact, an interval remaining always between them); that in *B. diphtheriae* only incomplete rupture of this membrane after fission occurs, the line of rupture running round only a portion of the circumference of the original rod, leaving a bridge connecting the new rods formed; that the enlargement of these rods before snapping and the tension thus produced originates the rupture; that the snapping is due to the sudden occurrence of the rupture, and that the preliminary angular position and the parallelism finally achieved are due to the pressure of the proximal ends of the new rods on each other, in composition with the restraint exercised by the unruptured strap-hinge-like portion of the original membrane. (Plate I., Fig. 1.)

Whether this hypothesis expresses the facts or not, it is true that in *B. typhosus* quite different fission and post-fission changes are usually to be seen. (Plate I., Fig. 2.) In this species (and in at least six others so far observed) fission is always clearly evidenced by a sharp separation of the protoplasm of the original rod into two usually equal portions, by a translucent segmentation interval. Later (*B. typhosus* and some others) a slight curve to one side is observed in one of the two new rods still in line with each other. This curve tends to straighten afterwards, the straightening being achieved by the proximal end of the curved rod slipping slowly out of line with the other rod, towards that side on which was the convexity of the curved rod. The two rods, now free at both ends, continue to grow, the proximal ends thus passing each other in opposite directions, and finally reaching, if nothing prevents, to the distal ends. The degree to which the slipping aside occurs, and the rapidity of growth of the two portions, determines in part the degree of parallelism achieved. In some of these "slipping" species the rods may grow so fast after separation that instead of ultimately lying side by side the impinging of one upon the other near the proximal end of the latter carries this latter in front of it, and swings it round so that it lies across and in front of the axis of the first, forming an irregular T. Naturally the movements are most finished and regular where isolated individuals are under observation. In mass-growth the mutual pressures of many close-lying rods modify the motions of each. In liquids, the slipping movements evident in hanging blocks or on the free surface of solid media, have of course no

opportunity for development since there is nothing to retain the rods in their original positions. The snapping of *B. diphtheriæ*, however, occurs under all these conditions.

In certain species showing segmentation intervals the new rods seem to remain connected as a rule at their proximal extremities, so that "slipping" does not occur. Such forms neither "snap" nor "slip."

The Branching of B. diphtheriæ.

(Plate II.)

The observations of various investigators on dried and stained preparations, in addition to those of the writer on such preparations, and especially on actually developing branching forms,⁸ seem to justify the following conclusions:

First. — Passive degenerative changes in dead or dying diphtheria bacilli may give rise to slight irregular projections which distantly simulate branches, using this term in its widest sense. (Plate II., Fig. 7.)

Second. — As a part of the active development of the diphtheria bacillus, active branching by apparent budding, ending in the production of an oval or elliptical body, probably capable itself of further development and the production of new rods, may occur in very young cultures, the parent stem then degenerating. (Plate II., Fig. 9.)

Third. — As a part of the active development of the diphtheria bacillus, branching similar to that described, but terminating in an ordinary diphtheria rod-like body, without any degeneration of the parent stem at the point of origin, may occur on serum or agar within seventeen hours, and this new rod may segment in the ordinary way or itself produce branches terminating in rods similar to itself or in oval bodies such as are described above. (Plate II., Figs. 10-24.)

Fourth. — Various modifications of the processes described probably exist.

Fifth. — Branching may be evolutionary or reversionary in origin or merely due to peculiar conditions not yet understood. Whether these conditions are more favorable or less favorable than those which encourage simple fission is yet to be determined.

In the following plates are given reproductions from drawings, made to scale in outline by the writer, of diphtheria and typhoid bacilli in the process of development in hanging block preparations at 37° C., and also reproductions in colors, not to scale, of drawings from dried and stained preparations, indicating certain points relating to the former species.

References.

1. Wesbrook. Transactions Amer. Pub. Health Assn., 1900.
Transactions Amer. Assn. of Phys., 1900.
 2. Nakanishi. Central. f. Bakt., 1901.
 3. Hill. Journal Med. Research, Jan., 1902.
 4. Ohlmacher. Journal Med. Research, Jan., 1902.
- See also Bibliography in No. 3 above.

INVESTIGATION OF THE BOSTON ICE SUPPLY.

In 1901 the investigation (begun in 1898) was continued further. Recognizing that chemical analyses alone would be of no practical sanitary value, inspections of the sources of supply were authorized by the Board, and were made by Mr. Jordan, chief sanitary inspector, and the writer. The ice-houses were visited, and samples of ice from each were analyzed (a total of sixty-seven analyses in all) by B. R. Rickards, assistant bacteriologist. So much of the analytical work as was of value in arriving at the sanitary condition of the ice supply is given elsewhere. (Report of the Board of Health to the Board of Aldermen.)

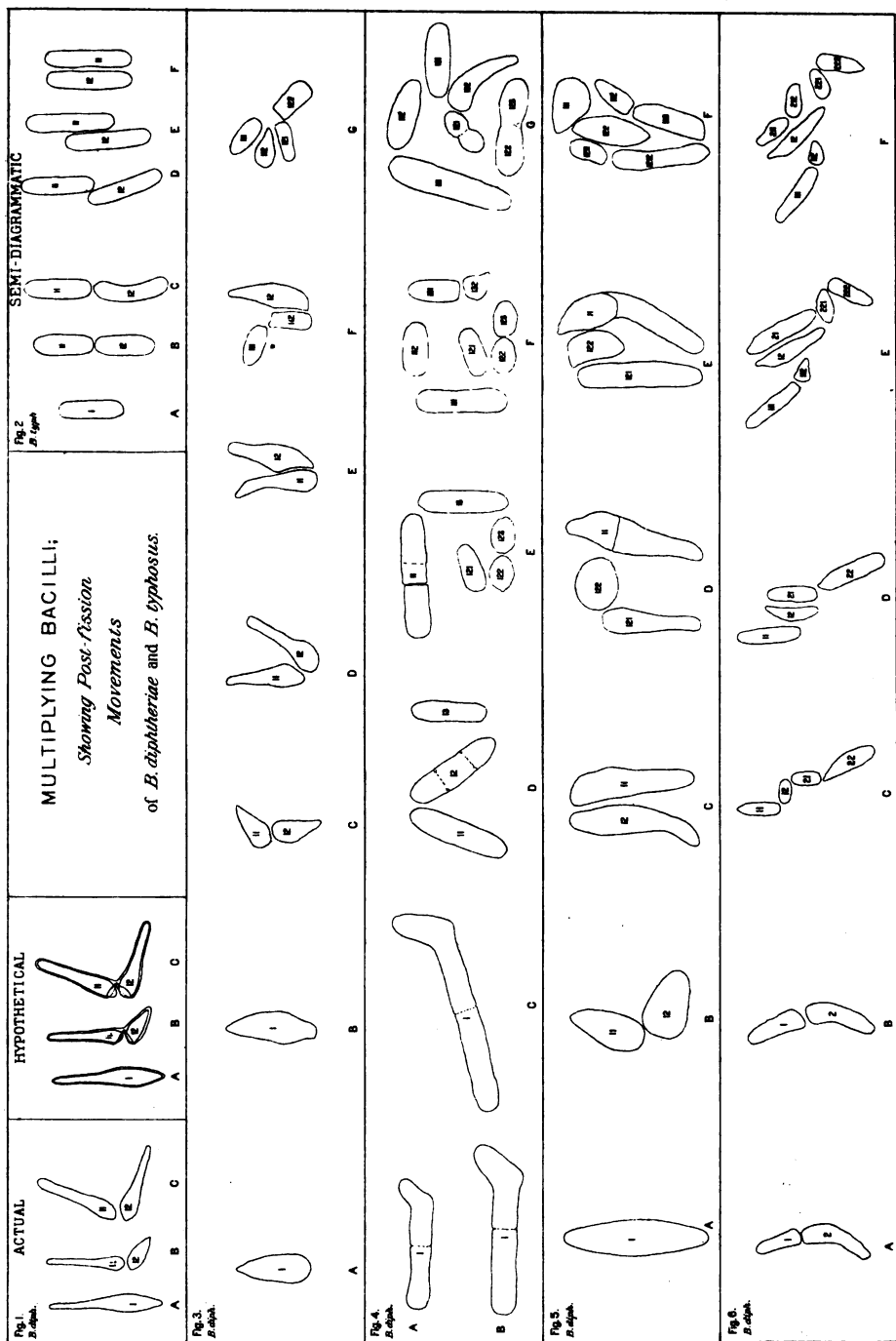
The ice supply is derived at present from both natural and artificial sources. The former consists of four ponds in New Hampshire, and about twenty-four ponds and the Charles river in Massachusetts. The Massachusetts ponds are nearly all within thirty miles of Boston. Two ice ponds and the Charles river are partly, or wholly, within its limits.

A list of these supplies, giving certain particulars, is shown in the following table:

SOURCES OF NATURAL ICE IN 1901.

Supply.	Nearest Town.	Area. Acres.	No. of tons cut.
MASSACHUSETTS SUPPLIES.			
Charles River.....	Boston		40,000*
Strong's Pond.....	Boston	10-15*	12,000
Kibler's Pond.....	Boston	16*	1,000
Pope's Pond.....	Milton	20*	12,000
Turner's Pond.....	Milton	20*	12,000
Hammond's Pond.....	Newton.....	28	8,000
Morse's Pond.....	Wellesley.	88	20,000
Wigwam Pond... ..	Dedham.....	82	10,000
Morey's Pond.....	Walpole.....	10-20*	2,000

* Estimated.



DESCRIPTION OF PLATE I.

Multiplying Bacilli, showing post-fission movements of B. diphtheriæ and B. typhosus.

Drawings made from direct observation of bacilli, developing in hanging block preparations, under the microscope, at 37° C., warm stage. The individuals in each figure are drawn to a common scale, but the scale was not the same for all the different figures. The diphtheria bacilli examined were derived from cultures obtained in the routine diagnostic work of the Boston Board of Health, and were typical in morphology, cultural reactions and virulence. The typhoid bacilli observed were derived from the culture used in the laboratory for the Widal test.

Figure 1.—Actual. *B. diphtheriæ*, illustrating “snapping.” (A) became (B) suddenly, the change occurring under the writer’s eye; (B) became (C) gradually, as is the rule in this species. *Figure 1.*—Hypothetical. *B. diphtheriæ*, illustrating the writer’s hypothesis of membrane rupture, devised to account for the snapping and subsequently achieved parallelism.

Figure 2.—Semi-diagrammatic. *B. typhosus*, illustrating the definite fission (B), gradual slipping aside of proximal ends (C-D) and subsequent parallelism (E-F), characteristic of this and some other species. This method is illustrated here to serve as a contrast to the snapping of *B. diphtheriæ*.

Figure 3.—*B. diphtheriæ*, illustrating development of a rod (A) into four daughter cells (G). (D) became (G) in 45 minutes.

Figure 4.—*B. diphtheriæ*, illustrating development of a rod (A) into six or eight daughter cells (G). (The final forms, 121, 122 and 123 in G were somewhat obscure.) Time relations: A to B = 60 min.; B to C = 30 min.; C to D = 55 min.; D to E = 20 min.; E to F = 12 min.; F to G = 68 min.; total, A to G = 4 hrs. 5 min.

Figure 5.—*B. diphtheriæ*, illustrating development of a rod (A) into six daughter cells (G). Time relations: A to B = 3 min.; B to C = 17 min.; C to D = 18 min.; D to E = 12 min.; E to F = 10 min.; total, A to F = 60 min.

Figure 6.—*B. diphtheriæ*, illustrating development of a rod (A) into seven daughter cells. It was uncertain whether 1 and 2 in (A) formed one or two separate cells, probably the latter. Time relations not noted.

The genealogical relationships of the new cells are indicated by a modification of Rickards’ system for culture record, which is elucidated clearly by the diagram (p. 76). The modification consists merely in omitting the decimal point and all figures to the left of the point.

DESCRIPTION OF PLATE II.

Branching B. diphtheriæ, degenerating, developing and dried and stained.

Figures 7, 8 and 9 illustrate branching as found in *B. diphtheriæ* under the same conditions stated for the observations recorded in Plate I.

Figures 10 to 24 indicate findings in dried and stained preparations from 17 hour cultures on serum and agar, showing certain relationships between metachromatic granules and branching.

Figure 7 illustrates degenerative "branching": (A), having clear outlines and ordinary density, showed swelling, granulation and breaking up (B); later shrinkage, with enlargement of granulations and further breaking up (C). In (B) and (C) a development of many fine granules and a progressive diminution in clearness of outline and in density, not indicated in the drawings, was also evident. The shrinking of the rod in (C) left two projections corresponding with granules and simulating branches. Time relations: A to B = 110 min.; B to C = 90 min.; total, A to C = 3 hrs. 20 min.

Figure 8 illustrates a form of apparent branching which seemed to give some support to Nakanishi's hypothesis of branching.

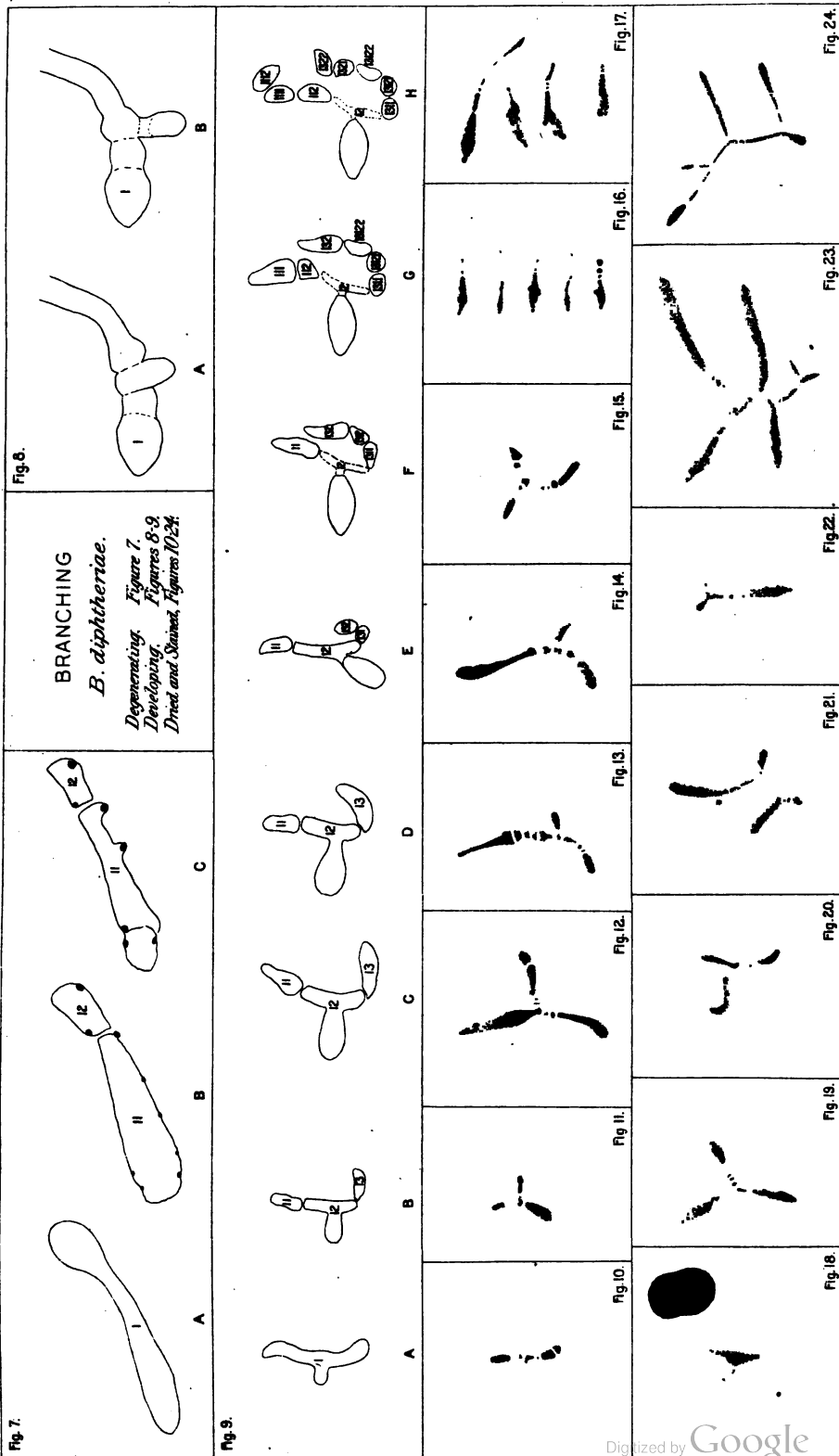
Figure 9 illustrates branching by apparent budding. The form (A) gave rise to nine daughter cells (H), of which eight were derived by the ordinary processes of fission, accompanied by the ordinary post-fission movements. The ninth and largest daughter cell arose as shown (A-D) by gradual enlargement of the original branch. At (E) the branch "snapped" suddenly to one side on its stem (12); this "snapping" occurred under the writer's eye. Thereafter the stem (12) became faint, losing its density and plumpness (F-H). Time relations: A to B = 37 min.; B to C = 32 min.; C to D = 16 min.; D to E = 8 min.; E to F = 62 mins.; F to G = 37 min.; G to H = 38 min.; total, A to H = 3 hrs. and 50 min.

Figures 10 and 19 to 24 show branching in the absence of metachromatic granules.

Figures 16 and 17 show metachromatic granules in the absence of branching.

Figures 11 to 15 show metachromatic granules in combination with branching. In *Figure 12* a granule is situated at the base of a branch, although this condition is more frequent than might be supposed from these plates.

Figure 18 is a nondescript form in which an attempt at branching seems to have been made. The large splotch and small dot accompanying this figure are of the same color as the metachromatic granules and are inserted to show that the ease of recognition of color depends in part on the area of the colored surface.



SOURCES OF NATURAL ICE IN 1901. — *Concluded.*

Supply.	Nearest Town.	Area. Acres.	Tons cut, No. of
MASSACHUSETTS SUPPLIES. — <i>Concluded.</i>			
Washakum Pond.....	So. Framingham.....	98	20,000
Lake Quannapowitt.....	Wakefield.....	264	70,000
Horn Pond.....	Woburn.....	91	25,000
Great Pond.....	So. Weymouth.....	288	25,000
Warren's Pond.....	Littleton.....	40	30,000
Sandy Pond.....	Ayer.....	80	30,000
Silver Pond.....	Plympton.....	728	20,000
Silver Pond.....	Wilmington.....	38	40,000**
Mirror Pond.....	Hudson.....	46	40,000
Rock Pond.....	Georgetown.....	43	10,000*
Chebacco Lake.....	Hamilton.....	260	15,000
Wenham Lake.....	Beverly.....	255	15,000
Maple Spring Pond.....	Jefferson.....	25	10,000
Great Pond.....	No. Andover.....	621	10,000*
Massapoag Lake.....	Sharon Heights.....	460	30,000
Flint's Pond.....	No. Grafton.....	?	25,000
NEW HAMPSHIRE SUPPLIES.			
Country Pond.....	Newton Junction.....	60*	25,000
Lake Paugus.....	Lakeport.....	2,000*	18,000
Lovell's Pond.....	Sanbornville.....	1,000*	70,000
Milton, 3 Ponds.....	Milton, 3 Ponds.....	60*	30,000**

* Estimated.

** Said to be retailed for preserving fish exclusively.

NOTE. — While this list may be considered reasonably accurate as representing the sources of this year's supply of ice, it must be remembered that minor changes occur from year to year, although as a whole the sources of supply remain fairly constant.

Two places listed as ponds in the above (Kibler's and Pope's) are not permanent ponds, but merely hollows which are flooded each year in the autumn.

Outline of natural ice business in Boston. — The natural ice shipped into Boston from a distance is loaded, for retail purposes, into ice-wagons directly from the cars. From the few ice-houses in Boston the ice is generally taken directly into wagons.

Eight ice companies cut, store and sell their own ice at retail for domestic purposes. Another company cuts its own ice for the fish trade. Four or five buy their ice from outside sources, and three others cut ice for wholesale purposes chiefly. Some of the retail ice dealers sell also wholesale to

small companies, who in turn retail it. Thus the ice cut originally by about fifteen different companies is sold ultimately through about twenty-three, or more, different companies or dealers. Moreover, the various dealers buy or borrow from each other more or less freely, as they may require ice to meet an emergency shortage.

The total amount sold in Boston annually is estimated at 300,000 to 400,000 tons, representing about 75,000,000 to 100,000,000 gallons of water; about equivalent to one to two days' tap water consumption in the City of Boston. A large proportion of this is used for domestic refrigerator purposes. Only a small portion is actually consumed in food or drink.

Pollution of natural ice. — As was pointed out in a former report (1900), ice, unlike water and milk, cannot, practically speaking, become contaminated in transit. Any pollution which it may contain must usually have been incorporated with it at some time during the freezing process. This pollution may be present in the water just previous to freezing, it may be deposited on the surface of the ice and be frozen on, or, if flooding be employed, it may be frozen into the new ice thus formed above the old.

Danger from polluted water supplies. — In this country the danger from polluted waters is practically only that due to the presence of the typhoid bacillus. Other water-borne diseases are practically unknown here. Of course, lead poisoning occurs at times, but this does not enter into consideration when surface water supplies, un piped, are in question. Since typhoid bacilli are closely associated with sewage, it is properly considered that no water is fit for human use, as a water supply, if human sewage, or the bacteria therefrom, reach it undestroyed.

It is proper, therefore, to consider to what dangers ice is exposed if formed from typhoid-infected waters, and to what extent such infected, or likely to be infected, waters contribute to the Boston water supply.

Typhoid bacilli in relation to ice. — These relations have been considered by Prudden, by Sedgwick and Winslow, and by Park. The first-named confined himself to the qualitative results. The others, however, worked out quantitatively the reduction in numbers achieved in various ways. These observers found, that, beginning with a certain number of typhoid bacilli in the ice, after three weeks the percentage dead is the same as the percentage purification achieved in good sand filters and equivalent to a bacterial efficiency of 99.5%. Hence, ice known to be definitely infected with typhoid bacilli might, after standing three weeks from the date of

freezing, be consumed with no more danger than that involved in drinking infected water after efficient filtration. Moreover, this degree of purification is that attained if the whole number of typhoid bacilli originally in the water be incorporated (as by flooding) in the ice. If, however, the ice be formed by the ordinary process of freezing downward from the surface, the mere act of freezing results in a diminution of 90% at least, by physical throwing out of the bacteria. The remaining 10% are reduced in proportion to the diminution above given, and in two weeks the percentage remaining in the ice, as compared with the number in the water originally, would give nearly the same purification as that of the filter. In three weeks the purification would be much greater.

Finally, Winslow has shown that typhoid bacilli in water kept just above the freezing point for twenty-four hours are reduced by 90%, thus furnishing an additional safeguard.

These considerations indicate that cases of typhoid fever, due to ice, might naturally be expected to occur, if at all, at the time immediately following the cutting of the ice, and as this is usually done in January, after March at latest the ice could hardly be held responsible for any trouble, even were it known to be infected. Only a small proportion of ice is delivered to consumers at this time, the great bulk of the trade not beginning until May.

Opportunities for infection of ice.—Notwithstanding all the factors of safety inherent in the ice itself, there can be no question that the safety is not absolute. It is *possible* for ice to convey typhoid fever, if it should become polluted with typhoid discharges. Are the conditions of the Boston supply such that this possibility has any chance of realization?

The pollution of water with typhoid discharges does not render the water capable of transmitting the disease for a subsequent period of more than two or three weeks, for in this time the bacilli die out. A water supply must, therefore, be infected within at most a month previous to the formation of ice, in order that the ice then formed may contain any living typhoid organisms. The ice for the Boston supply is cut about January and February, and the ice begins to form from one to six weeks earlier. Thus, the middle of November in Massachusetts, and the middle of September in New Hampshire, are usually the earliest dates at which infection of a supply could possibly give rise to infection of ice. This practically eliminates from consideration infection resulting from summer residents, leaving for consideration the men employed in the ice-cutting operations, occasional visitors and permanent residents. The first number about

2,500 to 2,700, and most of these are present at the ponds only during the ten to twenty days of the ice-cutting period, not arriving until the ice is formed, and departing as soon as it is housed. Occasional visitors, such as gypsies, hunters, etc., are not likely to be abundant at this time of the year, nor to be suffering from typhoid fever. Skaters are likely to be abundant, but not likely to be suffering from the disease, or to deposit their discharges on the ice in appreciable amounts. Permanent residents are as a rule few in number, and in no case was direct discharge of sewage from such into the supplies detected, with one or two possible exceptions. Even in these, the amount and character of the drainage was of little material moment.

Artificial ice.— The artificial ice supply of the City of Boston is derived principally from two plants, one turning out about 20 tons per day, the other at present about 125 tons. The processes are practically the same in both, although the mechanical devices differ somewhat. These plants are described in some detail in the report already referred to.

Dangers from artificial ice.— The water which is converted into ice is usually obtained by condensation of the exhaust steam from the engines required for the operation of the ammonia process. The boiling and distillation of the water, incident to its use in driving these engines, of course sterilizes it completely. The filtering and storage of the water may, or may not, according to circumstances, encourage the development of bacteria which may reach the water from the air, etc. (it is well known that boiled water supports bacterial life much better than unboiled water), but any typhoid bacilli in the original water would unquestionably be destroyed by the heat, and only under very exceptional circumstances could the water be reinfected before freezing. Once infected, however, at this point — as from a typhoid fever case among the employees — the freezing itself would be less efficient as a safeguard than in the case of natural ice, for no mechanical throwing out of the bacteria can take place, and since the ice is used (at present) very soon after its formation, so great a bacterial purification by the death of the bacilli as occurs in natural ice would not be obtained. It is clear, however, that while the likelihood of artificial ice transmitting typhoid fever, if once infected, is greater than that of natural ice, the likelihood of its becoming infected is less; so that practically one is just as safe as the other. If the artificial ice were stored as long as the natural ice usually is, the purification would be practically as great.

Dirt in ice. — Natural ice, after melting, often presents a certain amount of material which tends to settle to the bottom, consisting usually of amorphous brown or black material, and of other matter largely vegetable in origin. This material, being of nearly the same specific gravity as water, floats about readily on slight agitation, and gives to the water a rather disagreeable appearance. Dirt carried down on the ice by light falls of snow, or deposited by winds, etc., is likely, especially if dark colored, to absorb heat and melt its way downward into the ice. Snow ice is apt to be particularly dirty, and often contains a good deal of matter carried out of the air by the snow in falling. It is for this reason that snow ice is not highly appreciated by the consumer. Moreover, when skating is allowed on a pond used as an ice supply, and under all conditions during the ice-cutting season, more or less dirt is deposited on the surface of the ice, and is likely to be incorporated in the snow-ice layer. Where flooding of an ice field, already dirty from these causes, is done, the dirt may be incorporated in the centre of the block.

The snow ice which may form on the surface is usually planed off by the companies before storage, but a layer an inch or two thick is usually left, because it is supposed to render the block less fragile and to lessen the rate of melting. In no case in the present year was more than about this amount of snow ice detected.

Artificial ice may at times be quite free of turbidity, but none of that so far examined in Boston was perfectly so. During the process of freezing, each can, containing the partially frozen water, is covered by an oblong slab of wood, and these are so arranged as to form a floor, upon which the employees walk in filling and emptying the cans. Dirty boots carry an amount of miscellaneous, although usually harmless, dirt on to this flooring. Dust blowing in through windows, and from the wear and tear of the boards, is shaken from the covers and easily reaches uncovered cans. Further, a small quantity of oily matter from the engines is detectable at times. Careless employees spitting about the board floor also add to the available sources of dirt. Similar kinds of dirt are evident in natural ice, but in the absence of flooding they would not be incorporated with the ice, but merely deposited on the surface, whence they would stand a good chance of being removed by planing or shrinkage.

LAUNDRIES.

Under instructions from the Board of Health an investigation was begun in February, 1901, to determine if infected clothing, sent to a public laundry, would be rendered free of infection by the laundry processes; also what the danger in sending infected clothing to public laundries really is, and finally to discover if a simple and efficient method for avoiding such danger, while permitting laundries to handle such material, could be devised.

Washing is done:

First. By private families for themselves.

Second. By private persons (ordinary washerwomen) for others.

Third. By public hand laundries, American and Chinese.

Fourth. By steam laundries, using mechanical devices.

The first two classes are beyond the reach of the Board of Health. Classes three and four may, however, be inspected and regulated under the general powers of the Board.

A series of inspections were made by the chief sanitary inspector and the writer. The methods followed in the various laundries were noted in detail, and especial attention was paid to the possible disinfectant action of the various agents used in cleansing — heat (moist and dry), soaps, ammonia, bleaches and neutralizers.

The boiling given to white goods, other than woollens, and sometimes to colored goods, is a perfectly efficient disinfectant. Woollen goods, however, are likely to escape thorough disinfection, since moist heat above 110° to 120° F. is believed to injure them, and to these special attention was directed. The use of disinfectants for this purpose was considered, but was given up, first, because of the bad effects upon the goods themselves and second, because of the quite impracticable cost.

Staph. py. aureus, as a type of the more resistant common pathogenic forms, was exposed to the action of the various temperatures and solutions during the same lengths of time used for woollens in laundry practice. The conclusion was reached that *Staph. py. aureus* would ordinarily survive any one of the necessary steps of the ordinary woollen washing processes.

The difficulty in determining whether this organism would resist *all* these processes in their usual sequence lay in the fact that it was not considered proper to mix with the clothes of a general laundry any infected material in order to make the test. Such experiments were, however, made later in

the year, when, by the kindness of a large steam laundry in Boston, a private room was equipped for the purpose.

The infected material was washed by itself, rubber gloves were supplied to the expert washer who did the work, and appropriate disinfection of all the utensils, tubs, etc., used was performed afterwards. In these experiments, *B. tuberculosis* in sputum and *Staph. py. aureus* in culture were dried on woollen goods, and the goods were then washed in the ordinary way. Portions of the goods were removed for examination at various stages of the process, and the wash water itself was tested also, since it was believed that a large proportion of the infective material might be removed by the rubbing, rinsing, etc., and be suspended, still living, in the wash water, whence it might be transferred to other goods or deposited on the tubs or hands of employees or otherwise scattered about the laundries.

The results of these experiments showed that the infective material is partly washed off, and that *B. tuberculosis* may be recovered alive and virulent from the wash waters, as well as from the goods, after washing. After drying and ironing, however, this organism was not recovered from the goods. A number of the animals inoculated for the purpose of detecting the persistence of this organism and *Staph. py. aureus* died by infection from other organisms unavoidably gathered in the course of the experiments, and only the positive results can be considered of value in any case.

Conclusions.—For the present it would seem proper to continue the advice given heretofore by the Board of Health that in all cases of infectious diseases, clothing of every description should be boiled before being washed, and that such infected material should not go to public laundries at all, but be washed at home. Uninfected material can of course do no harm.

CLAMS FROM MYSTIC RIVER.

Under instructions from the Board of Health, Mr. Jordan, chief sanitary inspector, and the writer visited the Mystic flats situated in the neighborhood of Malden bridge and Boston & Maine Railroad bridges about 11 to 12.30 A.M., March 28, 1901.

The tide was low; the flats extended on the Everett side of the river nearly to mid-channel below and above Malden bridge. Below Malden bridge ten men were digging and two or three dories were seen. Above Malden bridge were several little groups of men; two men below the first railway

bridge, two a short way above and eight still further up. On the return trip one man was seen just above the first railway bridge. All these were digging clams. Clams were bought from the first pair, who stated that the clams were for home use. The second pair stated that they peddled the clams in Everett. One of the eight men also stated that he and others dug them to sell at T wharf at thirty-five to fifty cents a basket. The fourth man dug them to trade for beer at the factories.

At the back of the almshouse, sewage outlets with deposits of feces and a privy closet suspended over the channel were seen — a heap of feces under the latter. Drains of various kinds empty into the river all along this part of the stream below the chemical works and from the works themselves. On the Everett side of the narrow channel a chemical works drain enters, but no clams were found in its immediate vicinity. A few empty oyster shells were seen scattered over the flats. Oysters are said to exist below the Malden bridge.

SURVIVAL OF TYPHOID BACILLI IN BODIES OF COOKED SHELL-FISH.

It has been generally held that transmission of typhoid fever through oysters, clams, cockles, etc., occurs only when the latter are eaten raw; and as yet no clear case of transmission through cooked shell-fish has been recorded, so far as the writer is aware. To oysters, cooked as a plain roast, several typhoid cases which occurred at Marion last year were attributed; but in the writer's opinion the proof was not conclusive.

Nevertheless, it is possible for typhoid bacilli in the interior of shell-fish to survive for a brief period the temperature to which they are subjected in certain forms of cooking.

In 1900 certain work connected with this subject was undertaken, and in continuation of this in 1901 the temperatures attained in different forms of cooking were ascertained by visiting the Boston Cooking School, the Touraine, and Marston's Restaurant. These were compared with the temperatures found in infected oysters experimentally cooked in the laboratory. The names of the cooking processes, the processes themselves, and the temperatures reached varied in all of these three places; but enough was found to show that typhoid bacilli within the body of shell-fish may at times survive the temperatures reached in some cases.

The temperatures used in cooking shell-fish do not remain constant for any length of time, but are characterized by a

sharp rise and a slow fall. It is generally accepted that 160° F. maintained for ten minutes will kill most typhoid bacilli, but in few processes of cooking shell-fish yet noticed has such a condition been maintained. The problem is a somewhat intricate one, and the few figures which can be as yet submitted are suggestive only.

In order to be sure of recovering the typhoid bacilli from the oysters readily, threads with needles on them were dipped into broth cultures of typhoid bacilli and put through the oysters. Then the thread was cut off at the surface, leaving a piece in the middle of the oyster. This was removed, to recover the culture, after exposure of the oyster to the heat. It must be remembered that shell-fish, oysters and clams in particular, lying in sewage-polluted water, take into their intestines, and perhaps their tissues, the sewage bacteria. It is the bacteria in these situations, not those in the water outside the body (and inside the shell), which survive cooking, when any survive at all.

Oysters thus artificially infected with typhoid bacilli and immersed in boiling water yielded growths of typhoid bacilli when the period of boiling was one minute, the cultures being made immediately on removal from the water. Cultures made one minute after removal were also positive, but those made two minutes after removal were doubtful.

Infected oysters and clams, exposed for two minutes to boiling water, yielded positive results in cultures made immediately on removal, but failed to yield positive cultures one minute, two minutes, and three minutes after removal. Exposures to boiling water for three and four minutes failed to give positive results.

The temperatures developed in the bodies of oysters, etc., prepared as for the plain roast, the fancy roast, the pan roast, in frying, and in some forms of chowder, fell below that similarly developed by two minutes' boiling in water. Some forms of roast fell below that found in one minute's boiling in water.

Of course, a very little heating, more or less, will decide the matter in any given case. While no very striking new source of infection has been unearthed, yet a good reason for investigating the exact facts concerning even "cooked" oysters, where oysters are in question as means of infection at all, is supplied.

The work, from a rush of other things, was rather incomplete, and only the actual facts found can be regarded as being of value. The negative results require further confirmation.

SUSPECTED PTOMAININE POISONING.

In March, 1901, a family of four (father, mother, boy and girl) ate corned beef; the girl was slightly sick afterwards. The beef was submitted for examination, but nothing objectionable was detected.

On January 9, 1902, a mother and four children, the latter aged one year, three years, five years and nine years, ate cheese and German sausage for dinner. A physician was called about 3 P.M. the same day, and found them on the floor, showing headache, pain in stomach, flushed face, rapid pulse, extreme weakness, no rise of temperature, and vomiting a great deal, the vomit thin and watery. Next day the patients were still weak and dizzy, but recovered rapidly.

The German sausage was emulsified with water and dialysed against strong salt solution through a sterile tubular collodion membrane. After the water level in the tube had risen by osmosis well above the level of the emulsion in which it was immersed, the contents of the tube were concentrated under partial vacuum below 50° C. to dryness. The residue was taken up in a small quantity of sterile water, and injected subcutaneously into a guinea pig, which died within twelve hours, showing very extensive subcutaneous oedema (thorax and abdomen, axillæ and inguinal regions). A large bacillus was found in the oedema, evidently accidental; it was grown in broth forty-eight hours, and inoculated subcutaneously into a second guinea pig, which survived without other than merely circumscribed local lesions.

Conclusions. — From the description of the symptoms and the guinea-pig results it seems that true ptomaine poisoning of a mild type resulted from the use of the German sausage.

CANDY-MAKING.

Under instructions from the Board of Health the Chief Sanitary Inspector and the writer visited a number of candy makers, beginning with some of the best and ending with the worst. Nothing actively harmful was discovered, and it appeared that the chief objections to the very cheap places operated against the makers themselves rather than the products. Many of these places were basement rooms, badly lighted and ventilated, more or less dirty and disordered, far from ideal for working in. The materials used for candy in such places were naturally of the cheapest grades, but it is probably true of them, as is stated by the State Board of

Female — Adult.

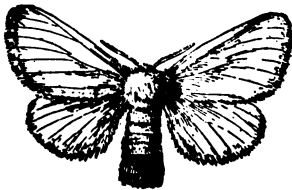


FIG. 1.

"Tent."



FIG. 2.

Caterpillar.

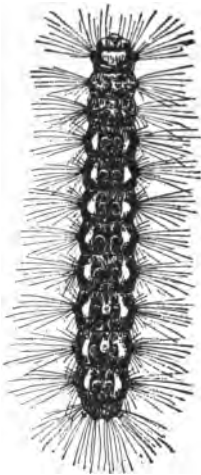


FIG. 3.

Caterpillar.

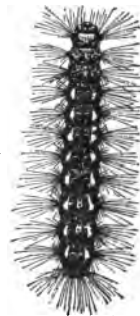


FIG. 4.

Health of the general food supply of Massachusetts, that the adulterations, when they exist, are usually financially fraudulent rather than physiologically harmful.

ARSENIC IN PAINT USED FOR PUBLIC SCHOOLS ON BLACKBOARDS.

In October, 1901, complaint was made to the Board of Health that arsenic had been used in tinting the blackboards of the Lincoln School on Waltham street. The school was visited by the Chief Sanitary Inspector and the Assistant Bacteriologist. Scrapings, taken from the boards for analysis, in no case showed the slightest trace of arsenic.

A sample of wall-paper from a house where there had been considerable sickness was submitted to the laboratory for analysis in October, 1901. This was found to be absolutely free from arsenic.

THE BROWN-TAIL MOTH.

The brown-tail moth (*Euproctis chrysorrhea*), a variety well known as a defoliating pest in orchards, etc., in Europe, and in adjacent parts of Asia and Africa, was introduced into this country at least ten years ago, probably earlier. Reliable information dates its first appearance in Somerville as 1892.

The attention of the Board of Health was directed particularly to it in the summer of 1901, on account of a supposed "epidemic" with rashes, etc., occurring in Brighton.

Investigation traced this outbreak to the irritating hairs shed by *Euproctis*.

The male moth is about $1\frac{1}{2}$ inches from wing tip to wing tip (extended), the female about $1\frac{1}{2}$ inches. (Plate III., Fig. 1.) The males show only minor differences from the females in coloring, etc., both being white, except for a reddish brown tuft of hairs (lighter and larger in the female) at the end of the abdomen.

The eggs are usually laid about the middle of July, 200 to 300 at a time, usually on the under sides of leaves, in crevices, under clapboards, etc. These masses of eggs are covered with a mat of brown hairs from the abdomen of the female. They hatch soon after being laid, and the young feed up to October on the leaves. They then make for themselves winter quarters by drawing together with "silk" a few leaves at the tips of twigs. From these "tents" (Plate III., Fig. 2) they emerge in the spring, often before the leaves begin to grow, and feed upon the leaf buds and later the leaves. The caterpillars (Plate III., Figs. 3, 4)

have a dark-brown or black body, with numerous fine orange or gray spots. Long reddish-brown hairs arise from the tubercles, and also white hairs from some, forming elongated white spots along each side, a striking characteristic.

These caterpillars moult at intervals up to the middle of June, when they form cocoons and enter the pupa state, emerging as full-grown moths about the middle of July.

The hairs which produce the irritating lesions of the skin are derived from the living caterpillars, from the moulted skins and from the abdominal tuft of the adult moth. Those from the moulted skins and the mats laid over the eggs become dry, and are stated to be liable to distribution by the wind, and in this way to produce trouble without actual contact of patient and insect. The hairs are very slender, stiff and barbed. It is believed that the action is purely mechanical, and that no irritating liquid, etc., accompanies them. It is, of course, obvious that bacteria may be introduced into the skin in this way, or that the lesions once formed may become infected with bacteria afterwards, especially if scratched by the finger nails, etc.

To get rid of these pests the "tents" should be cut from the trees during the winter months and burned. After the caterpillars leave the tents this is useless, and various insecticides must then be resorted to, of which arsenate of lead (5 to 10 lbs. to 150 gallons of water, sprayed) or paris green (1 lb. to 300 gallons, sprayed), or a kerosene emulsion may be used to advantage. The kerosene emulsion is thus made: common bar soap, $\frac{1}{4}$ lb. dissolved in 2 quarts of water; add to this hot solution 4 quarts of kerosene oil, and churn thoroughly for 5 minutes; mix 1 part to 9 parts of water; use as spray.

The information given above is condensed from a bulletin on the subject, issued by the Hatch Experiment Station in 1897, written by Fernald and Kirkland. A plate is appended, copied, with the courteous permission of Professor Fernald, from the same bulletin.

MALARIA AND MOSQUITOES.

The old belief that malaria was due to an indefinite something (called *miasma* for the lack of a better name), arising, in warm weather, principally at night, from wet or upturned soil, or from stagnant water, or carried by the winds from swamps, etc., has been modified from time to time since 1880, when Laveran, a French military surgeon, discovered that the cause of the disease is a minute organism, very low

down in the scale of life, belonging to the animal kingdom and classed as a coccidium under the name *Plasmodium malarie* or *Hæmameba laverani*. This parasite is found living and growing in the blood of malarial patients, and follows there a regular cycle of growth and reproduction.

The parasite is a tiny globular or irregular body, visible only under the microscope. In its early stages it is found in the red cells of the blood and in these enlarges rapidly, feeding on and destroying the cells, and breaking up finally into numerous small "spores" which swim freely about in the blood plasma for a time. These then enter red cells again, feed, grow and break up into spores as before. On the regularity of this cycle depends the regular recurrence of the fever at a fixed time every day, every two days, or every three days, as the case may be, the chill corresponding with the sporulation.

Laveran's discovery of the organism did not explain how it reached the human body or where it spent its earlier existence, but merely substituted a definitely known and named organism for the indefinite *miasma* previously accepted as the cause of the disease.

Other studies showed that various animals, frogs, turtles, lizards, snakes, birds and cattle, were infected at times with similar but distinct organisms, and in 1890 Dr. Theobald Smith, with Dr. F. L. Kilborne, showed that Texas fever in cattle is due to such an organism. They showed, moreover, that this parasite is carried from one animal to another by the ticks which infest the skins of these animals.

In 1894 Manson suggested that the carrier of the parasite of human malaria might be a mosquito. Ross, in India, proved in 1898 that a parasite occurring in birds' blood was actually thus carried from bird to bird by mosquitoes of the genus *Culex*. Later it was demonstrated absolutely by various workers that human malaria is carried from patient to patient by female mosquitoes of the genus *Anopheles*. The male mosquito does not bite and so cannot infect. For the points of difference between *Culex* (the ordinary mosquito) and *Anopheles* (the malaria mosquito), see Plate IV.

It is evident that this discovery explains fully the old belief in a *miasma*. The relation of malaria to warm weather, to low lying swamp lands, to stagnant water, to upturned soil, to exposure at night and to carriage by wind, becomes clear when it is remembered that the mosquito breeds at high temperatures, in swamps, etc., and in the pools often resulting from excavations; that it bites chiefly at night, and may be driven from place to place by the wind.

The mosquito must be first itself infected by biting some human being already infected with malaria. Anopheles in a given region are quite harmless, unless and until malaria patients are also present and are bitten by the mosquitoes, which may thus become infected and so able to transmit the disease to other persons. Conversely, also, the presence of malarial patients in a community will not spread the disease in the absence of Anopheles. If both malarial patients and Anopheles be present, with water where the latter may breed, and warm weather, all the requisites are provided. It is probably not necessary that the patient should be actually ill with malaria in order to infect the mosquito. A latent or recovered case may carry the organisms in the blood and thus may serve to infect mosquitoes just as may an active case.

An Anopheles which has filled itself with the blood, and parasites of a malarial patient cannot at once infect a well person. About ten to twelve days, varying with the temperature, must first elapse, and during this interval the malarial parasite must undergo a series of changes in the mosquito. The whole cycle from patient to patient may be briefly summarized thus :

Cycle in the Human.

1. Minute organisms in the red cells of the blood.
2. Growth of these.
3. Sporulation (giving rise to chill).
4. Return of spores into new red cells, beginning at No. 1 again.
(Some of the spores differentiate into males and females.)

The mosquito on drawing the blood receives these parasites into its stomach.

Cycle in the Mosquito.

5. Certain of the organisms, male and female, unite sexually in the stomach of the mosquito.
6. The female produces a small worm-like body.
7. This worm-like body penetrates the stomach wall and lies under its outer coat.
8. The worm-like body enlarges and breaks up into swarms of small rod-like bodies (sporozoites).
9. The sporozoites pass all through the body cavity of the mosquito and reach the salivary and poison glands.

The mosquito, if it now bites a human being, passes some of the sporozoites into the blood with its poison, and the sporozoites enter the blood cells, beginning at No. 1 as given above.

For further discussion and details, see article by Dr. Theo-

Culex-egg mass.

Fig. 1.



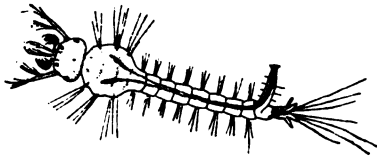
Anopheles-eggs.

Fig. 2.



Culex-larva-from above.

Fig. 3.



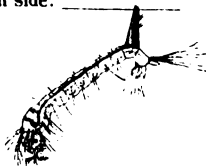
Anopheles-larva-from above.

Fig. 4.



Culex-larva-from side.

Fig. 5.



Anopheles-larva-from side.

Fig. 6.



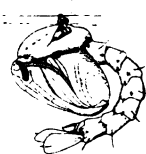
Culex-pupa-from side.

Fig. 7.



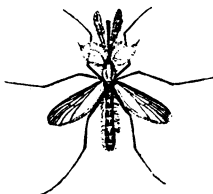
Anopheles-pupa-from side.

Fig. 8.



Culex-adult-male.

Fig. 9.



Anopheles-adult-male.

Fig. 10.



A. quadrimaculatus.

Culex-adult-female.

Fig. 11.



Anopheles-adult-female.

Fig. 12.



A. quadrimaculatus.

Characteristic attitudes.

Fig. 13.



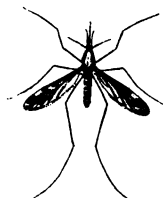
Culex.



Anopheles.

Anopheles-adult-female.

Fig. 14.



A. punctipennis.

DESCRIPTION OF PLATE IV.

Differences between Culex (the ordinary mosquito) and Anopheles (the malaria-carrying mosquito).

Culex eggs. — 200 to 400 eggs laid at one time by one female; aggregated in masses side by side, large end down; egg mass concave above; general color of mass from above, brown; the larvæ issue from lower end of egg, directly into the water, about twelve to sixteen hours after the eggs are deposited. (Figure 1.)

Anopheles eggs. — 40 to 100 eggs laid at one time by one female; eggs float separately on their sides; general color of eggs from above, black; the larvæ issue in three to four days. (Figure 2.)

Culex larvæ. — General color, brown; head and thorax wide; breathing tube, long. (Figure 3.) Feed near surface, breathing tube extended up to air, body at angle with surface, head and mouth down (Figure 5); when disturbed, they sink with quick wriggling movements downward to the bottom. The larvæ become pupæ in seven to ten days.

Anopheles larvæ. — General color usually black, but varies (green, etc.), head and thorax relatively narrow, breathing tube short (Figure 4); feed near surface, breathing tube extended up to air, body parallel with surface, head also at surface, mouth downward when resting, but turned up to the surface to seize food by rotation of the head (Figure 6); when disturbed, they skate backwards over the surface of the water, only sinking when frightened. The larvæ become pupæ in about sixteen days.

The pupæ of *Culex* and *Anopheles* resemble each other somewhat closely. (Figures 7 and 8.) Differences exist, but are not sufficiently striking for ready appreciation. The *Culex* pupa becomes an adult mosquito (imago) in about two days; the *Anopheles* pupa in five to ten days.

Adults. — The males of both genera can be distinguished from the females of both by the tufted antennæ of the former. (Compare Figure 9 with Figure 11, and Figure 10 with Figures 12 and 14.) *Culex* adults (male or female) can be distinguished from *Anopheles* adults (male or female) by the spots on the wings of the latter, small and brown in *Anopheles quadrimaculatus*¹ (Figures 10 and 12), large and black in *Anopheles punctipennis* (Figure 14).

Culex adults, when resting on a solid surface, take a hump-backed attitude, the abdomen lying more or less parallel with the surface; *Anopheles* adults take a straight position, the abdomen pointing away from the surface (Figure 13). In this regard, the difference between *A. punctipennis* and *Culex* is very striking, but is much less marked between *Culex* and *A. quadrimaculatus*. *Anopheles* females of both species can be further distinguished from all *Culex* females since they possess long palps giving them the appearance of having three "stings" instead of one. In the *Culex* female the palps are so short as to escape observation.

NOTE. — These reproductions are unfortunately to no definite scale, and may give the impression that great differences in size exist between these two kinds of mosquito. Such is not, however, the case.

¹ Synonym *A. maculipennis*.

bald Smith, Journal Mass. Ass'n Boards of Health; October, 1901, and "The Practitioner," March, 1901. Cassell & Co., London.

MISCELLANEOUS.

In addition to the foregoing, several minor investigations were made.

A case of suspected plague, held in quarantine in East Boston, was repeatedly tested for *B. pestis* with negative results. The patient was probably suffering from a low grade pneumonia, with enlarged axillary glands.

Certain milk examinations were made for the Boston Floating Hospital, and several analyses of water for the Park Department.

One or two tests of the effects of illuminating gas made upon the writer in person gave such marked results that further investigation in this way was abandoned.

About two thousand cultures, not included in those recorded in the appendix, were examined from the throats and noses of well persons, largely prisoners at Deer Island and inmates of the Pauper Institution at Long Island, to determine the frequency of occurrence in well persons of the diphtheria bacillus. The results, given in full elsewhere, may be briefly stated thus;—typical diphtheria bacilli (A, C and D of Wesbrook) were found in about 2.5% of well persons.

Tests of formalin and chloride of lime, used in the Board of Health work were made as usual. The methods used are briefly noted above by B. R. Rickards, assistant bacteriologist. A few experiments concerning the behavior of typhoid bacilli in ice, particularly directed to determine whether or not those few bacilli remaining alive after six days freezing would multiply in the water obtained by melting the ice, confirmed the work of previous investigators, and showed also that multiplication after such melting did not take place.

All of which is respectfully submitted,

HIBBERT WINSLOW HILL, M.D.,

Director.

APPENDIX TO LABORATORY REPORT.

TABLE SUMMARIZING ROUTINE EXAMINATIONS FOR YEAR
ENDING JANUARY 31, 1902.

	Diphtheria.	Tuberculosis.	Typhoid.	Glanders.	Malaria. ¹	Other diseases. ²	Total.	Av. per day.
February, 1901	1,788	139	67	15	2	2	2,012	
March.....	1,517	157	63	13	2	8	1,760	
April.....	1,062	184	57	10	7	12	1,330	
May.....	949	211	46	14	4	3	1,227	
June.....	799	175	58	17	9	7	1,068	
July.....	466	162	70	5	4	5	712	
August.....	385	135	118	11	15	5	667	
September.....	360	144	189	10	9	3	714	
October.....	559	159	119	25	12	3	874	
November.....	1,187	150	96	13	7	.....	1,453	
December.....	1,148	145	77	15	6	.....	1,387	
January, 1902.....	1,084	196	89	10	8	4	1,391	
1901-1902	11,304	1,957	1,049	158 ³	85	52	14,590	40
1900-1901	18,889	1,021	1,014	119	38	44	21,121	57
1899-1900	7,930	not done	483	65	19	29	8,876	24

¹ 10 positives.² Including gonorrhea, tetanus, septicaemia, etc.³ The glanders tables given beyond are from January 1, 1901, to December 31, 1901.

Table No. I.—Diphtheria.
SHOWING CULTURES CLASSIFIED.

	Positive.	Negative.	No Growth.	Total.
Primary.....	1,261	5,216	57	6,534
Secondary.....	1,369	3,368	33	4,770
Total	2,630	8,584	90	11,304

Table No. II.—Diphtheria.
SHOWING CASES CLASSIFIED.

	POSITIVE.		NEGATIVE.		NO GROWTH.	TOTAL.		TOTAL.			Grand Total.
	For Diagnosis.	For Release Only.	For Diagnosis.	For Release Only.	For Diagnosis Only.	For Diagnosis.	For Release Only.	Positive.	Negative.	No Growth.	
	1	2	3	4	5	6	7	8	9	10	
1901.											
February ...	170	36	605	49	0	775	85	206	654	0	860
March.....	150	36	597	71	3	750	107	186	668	3	857
April.....	126	20	488	45	2	566	65	146	488	2	681
May.....	127	15	411	30	3	541	45	142	441	3	596
June.....	90	18	256	50	3	349	68	108	306	3	417
July.....	44	13	180	31	1	225	44	57	211	1	269
August.....	41	9	160	15	4	205	24	50	175	4	229
September...	44	3	183	15	1	223	18	47	198	1	246
October.....	53	5	287	27	4	344	32	58	314	4	376
November...	102	19	622	42	2	726	61	131	604	2	787
December...	122	12	494	34	0	616	46	134	528	0	662
1902.											
January	107	19	446	42	0	553	61	126	488	0	614
Totals ...	1,176	205	4,679	451	23	5,878	656	1,381	5,130	23	6,534

Column 1 shows the whole number of persons proving positive for diagnosis. In some of these cases the first culture was negative, but subsequent cultures for diagnosis were positive. Some of these cases died, some went to the hospitals, 593 were released by this laboratory. Of this number 288 were positive for release as well as for diagnosis. Column 2 shows the total persons positive for release only, no culture (or in a very few cases a negative culture) being taken for diagnosis. Column 3 shows cases negative throughout for diagnosis. A few of these were reported as diphtheria in spite of the negative cultures, but these proved negative for release also. Column 5 shows cases on which none but no growth cultures were received.

The Probable Error in the Clinical Diagnosis of Diphtheria.

(TABLE II.)

This may be calculated in two ways: first, by comparing the physicians' clinical diagnoses at time of taking diagnosis cultures with the bacteriological reports on those cultures; second, by comparing the physicians' clinical diagnoses in cases on which no cultures are taken for diagnosis with the bacteriological results of the cultures subsequently sent in for release.

First method. The physician's diagnosis at the time of taking the first culture for diagnosis was diphtheria in 219 cases (1898), 607 cases (1899) and 425 cases (1900). The bacteriological report was positive in 124, 367 and 292 cases respectively, or 56 per cent., 60 per cent. and 68 per cent., an average of 62 per cent. of positive clinical diagnoses confirmed.

Second method. When cases bacteriologically positive for diagnosis come to be examined later on for release (soon after the disappearance of the membrane usually) about 50 per cent. of the cases (288 out of 593 in 1901) yield positive cultures for release. It seems safe then to say that every case positive for release corresponds with about two cases of true diphtheria and no more. Now in 1901 there were 656 cases (col. 7) reported as diphtheria without any culture positive for diagnosis. When these cases came to be released by culture, about 328 should have shown positive cultures on the above-stated grounds had the whole number been originally positive. As a matter of fact, only 205 cases (col. 2) proved positive for release, corresponding therefore with about 410 originally positive cases, and leaving about 246 cases which were probably negative throughout, about 38 per cent. The physician would therefore again appear to be right in 62 per cent. only of those cases which he calls diphtheria without cultural aid. (This second method of calculation was suggested by J. F. Broderick, clerk in this laboratory).

Table No. III. — Diphtheria.

SHOWING COMPARISONS OF THE WORK DONE IN DIFFERENT YEARS.

Actual Number of Cultures and Persons Examined.

Feb. 1, 1901, to Jan. 31, 1902	CULTURES.				PERSONS.				Cases Reported.
	Per Month.	For Diagnosis.	For Release.	Total.	Per Month.	Positive Diagnosis.	Negative Diagnosis.	Total Released.	
	1	2	3	4	5	6	7	8	
1898 (Est.)...	440	2,000	3,200	5,300	190	400	1,500	550	1,661
1899.....	660	4,408	3,522	7,980	380	1,019	2,920	1,002	2,836
1900 (Approx.)	1,560	8,000	10,800	18,800	700	2,100	5,600	2,000	5,020
1901.....	944	6,689	4,615	11,304	544	1,176	4,679	1,249	2,906
Feb., 1902...	999	727	272	999	674	88	585		196

Relative Number of Cultures and Persons Examined (Calculated per 100 Cases Reported).

1898.....	320	120	192	320	137	24	90	33	1,661
1899.....	280	155	124	280	160	36	108	35	2,836
1900....	370	159	216	370	167	42	111	39	5,020
1901.....	380	280	158	380	224	40	161	42	2,906
Feb., 1902...	510	370	138	510	343	44	300		196

Notes on Table III.

The official year ends January 31. The diagnostic diphtheria work is therefore tabulated on this basis, not on the calendar year.

This laboratory began work May, 1898. For that year therefore an estimate only is given, based on the actual figures for nine months. In 1900 the work was so heavy that absolutely accurate calculations could not be made in the time allowed for the preparation of the report. The figures given are, however, close enough for practical purposes.

The results obtained in February, 1902, are added to show the present status.

It will be seen (column 9) that the prevalence of diphtheria in Boston, as indicated by the cases reported, varied considerably, increasing about 75 per cent. each year from

1898 to 1900, and dropping back 40 per cent. in 1901. Naturally, the number of bacteriological examinations for diagnosis (columns 6 and 7) corresponds roughly with the prevalence of the disease, also increasing each year to 1900, and dropping back in 1901.

Owing to this correspondence of the amount of work with the prevalence of the disease, significant comparison of the work of the different years is best made on the basis of work done "per 100 cases reported," and such a comparison is given in the second part of Table III.

Column 1, representing cultures of all kinds (positives and negatives, both for diagnosis and release) shows a steady but small increase per 100 cases since 1899. The distribution of these cultures, however, is interesting. Thus the proportion taken "for diagnosis" (column 2) nearly doubled from 1898 to 1901, about half of this increase occurring in the latter year, while the proportion taken "for release" (column 3), after a rise in 1900, diminished by about 17 per cent.

The persons examined by the laboratory include only about 40 per cent. of those finally reported as diphtheria, the other 60 per cent. being so reported on clinical grounds or after removal to the hospital. A very large proportion of the persons examined prove negative, and in this direction (the examination of suspicious but really innocent cases) the work has increased considerably. Thus the total persons examined (column 5) include persons examined for diagnosis, both positive and negative, and persons examined for release, including some of those examined previously for diagnosis; and also many not examined for diagnosis, but reported as diphtheria on clinical grounds only. Elsewhere (page 102) it is shown that probably only about 62 per cent. of this latter group really was diphtheria.

The proportion of the reported cases which were diagnosed positive at the laboratory (column 6) increased from 1898 to 1900, but dropped back slightly in 1901. The proportion of negative persons for diagnosis (column 7), however, increased each year, giving a total increase of about 80 per cent. in the four years.

The number of persons released by the laboratory was increased also each year, reaching in 1901 nearly one-half the total number released. Somewhat less than half the total cases reported went to the hospital in this year.

Table No. 1. — Tuberculosis.

MONTHLY TOTALS OF EXAMINATIONS.

MONTH.	Positive.	Negative.	Total.
February, 1901	36	103	139
March.....	40	117	157
April.....	62	122	184
May	57	154	211
June.....	42	133	175
July	55	107	162
August.....	43	92	135
September.....	38	106	144
October.....	30	129	159
November.....	43	107	150
December.....	33	112	145
January, 1902	55	141	196
Totals	534	1,423	1,957

Table No. II. — Tuberculosis.

SHOWING RESULTS OF EXAMINATIONS CLASSIFIED.

NATURE OF SPECIMEN.	Primary Positive.	Primary Negative.	Secondary Positive.	Secondary Negative.	Total Positive.	Total Negative.	Total Examinations.
Sputum.....	475	1,301	58	209	533	1,410	1,943
Urine.....	0	6	0	1	0	7	7
Pus	1	4	0	1	1	5	6
Rectal discharge.....	0	1	0	0	0	1	1
	476	1,312	58	211	534	1,423	1,957
					27.8%	72.7%	100%

Table No. III. — Tuberculosis.

SHOWING CASES CLASSIFIED.

NATURE OF SPECIMEN.	Positive.	Negative.	Total.
Sputum.....	499	1,177	1,676
Urine	0	6	6
Pus	1	4	5
Rectal discharge.....	0	1	1
Total.....	500	1,188	1,688
	29.6%	70.4%	100%

Of the 500 positive cases, 95 per cent. (476) were found to be positive on the first examination, and 5 per cent. (24) on subsequent examinations.

Table No. 1. — Typhoid.

MONTHLY TOTALS OF WIDAL REACTIONS.

MONTH.	Positive.	Negative.	Atypical.	Total.
February, 1901.....	4	35	28	67
March.....	1	52	10	63
April.....	0	54	3	57
May.....	5	87	4	46
June.....	1	51	6	58
July.....	1	69	0	70
August.....	9	104	5	118
September.....	15	159	15	189
October.....	4	110	5	119
November.....	5	85	6	96
December.....	7	66	4	77
January, 1902.....	10	74	5	89
Totals.....	62	896	91	1,049

Table No. 2. — Typhoid.

SHOWING TOTAL WIDAL TESTS.

Positive.	Negative.	Unsatisfactory.	Total.
62	896	91	1,049
5.9%	85.4%	8.7%	100%

Table No. 3. — Typhoid.

SHOWING CASES CLASSIFIED.

Positive.	Negative.	Unsatisfactory.	Total.
62	740	41	843
7.3%	87.8%	4.9%	100%

Table No. 1. — Glanders.

MONTHLY TOTALS OF GUINEA-PIG TESTS.

MONTH.	Positive.	Negative.	Unsatisfactory.	Total.
January, 1901.....	8	5	0	8
February.....	6	7	2	15
March.....	4	5	4	13
April.....	3	6	1	10
May.....	6	4	4	14
June.....	2	6	9	17
July.....	3	0	2	5
August.....	4	4	3	11
September.....	2	3	5	10
October.....	8	5	12	25
November.....	4	7	2	13
December.....	7	2	6	15
Total.....	52	54	50	156

Table No. II. — Glanders.

SHOWING ALL CASES WHERE LIVING HORSES WERE TESTED.

RESULTS OF GUINEA-PIG TEST.	Number of Cases.	Per cent. of Cases.
Positive on first test.....	37	80.3
Positive on second test (first test negative or unsatisfactory).....	6	13.2
Positive on third test (early tests negative or unsatisfactory).....	1	2.2
Positive on fourth test (early tests negative or unsatisfactory).....	2	4.3
Cases negative by guinea-pig; finally clinically positive.....	7*	
Cases unsatisfactory only by guinea-pig; finally clinically positive.....	7	
Cases negative by guinea-pig; finally clinically negative.....	30	
Cases unsatisfactory only by guinea-pig; finally clinically negative.....	13	
	103	

* In one of these seven cases the lesion tested (abdominal abscess) was afterwards found to be due to an injury. A positive diagnosis was made clinically from later symptoms.

Table No. III. — Glanders.

SHOWING LESIONS FROM WHICH GUINEA-PIG TESTS WERE MADE.

LOCATION OF LESIONS IN HORSE.	RESULTS OF GUINEA-PIG TESTS.			
	Pos.	Neg.	Unsat.	Total
Nose.....	26	23	18	67
Scrotum.....	0	1	0	1
Submaxilla.....	1	0	0	1
Face.....	1	1	0	2
Leg.....	9	6	2	17
Abdomen.....	4	2*	0	6
Thorax.....	2	2	0	4
Lip.....	0	0	1	1
Neck.....	3	0	0	3
Shoulder.....	0	1	0	1
Lung nodule (autopsy).....	0	0	1	1
	46	36	22	104

* In one of these two cases the lesion tested was due to an injury, not due to glanders, although the animal was affected with glanders.

REPORT OF THE MEDICAL INSPECTOR.

To the Board of Health :

GENTLEMEN, — I have the honor to submit the following report for the year ending January 31, 1902:

Infectious Diseases.

During the past calendar year 504 cases of small-pox were found in the city. All these cases with the exception of four that were too sick to be moved, were sent to the hospital, at Southampton street or Gallop's Island. Women and children were sent to the main hospital (Southampton street), and adults that could be moved with safety were sent to Gallop's Island.

Of the 504 cases, 281 were males and 223 females.

Number admitted to Southampton street	415
Number admitted to Gallop's Island	85
Number at home	4

Total	<u>504</u>
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Number transferred to Gallop's Island from Southampton street 149, making a total at Gallop's Island of 231. Total number of deaths (44 males and 30 females) 74.

Number died at Southampton street	52
Number died at Gallop's Island	19
Number died at home	3

Total	<u>74</u>
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Ages of Patients Admitted.

One to 5 years, 88; 6 to 12 years, 41; 13 to 21 years, 36; 22 to 35 years, 194; 36 to 50 years, 110; 50 years and over, 35.

Of the patients admitted the youngest was seven days old, and the oldest 75 years old, both patients unvaccinated. Of these cases (504) 226 presented some evidences of vaccination at some period of life, and 278 were unvaccinated.

Deaths of the vaccinated 19. Deaths of unvaccinated 55.
General mortality 14%. Mortality of unvaccinated 19%.
Mortality of the vaccinated 8%.

Unvaccinated persons over 16 years of age. Number of cases 152. Number of deaths 33. Number surviving 119. Mortality 22%.

Unvaccinated children under 5 years. Number of cases 88. Number of deaths 18. Mortality 20%.

Vaccinated children between 5 and 16 years of age. Number of cases 4. Number living 4. Number of deaths 0.

Vaccinated adults over 16 years of age. Total number 222. Deaths 19. Mortality 8%. Deaths, ages between 20 and 30 years, 3; 30 and 40, 7; 40 and 50, 3; 50 and over, 6. Total 19.

Among these 504 cases no death occurred in any person who was under 20 years of age, who had ever been successfully vaccinated.

Deaths in the Vaccinated.

Age.	Entrance.	Died.	Nativity.	Note.
29	October 27.....	October 28.....	America.....	1 faint scar.
23	November 1.....	November 9.....	England.....	1 faint scar.
28	November 2.....	November 8.....	England.....	1 fair scar.
58	November 18.....	November 24.....	America.....	1 scar.
36	November 19.....	November 21.....	England.....	1 light scar.
39	November 20.....	December 15.....	America.....	1 scar.
32	November 22.....	December 6.....	Newfoundland.....	2 scars.
30	November 24.....	November 24.....	America.....	1 light scar.
38	November 24.....	December 1.....	America.....	1 light scar.
55	December 1.....	December 9.....	Ireland.....	1 scar.
46	December 1.....	December 6.....	America.....	1 fair scar.
35	December 5.....	December 6.....	Norway.....	1 scar.
31	December 6.....	December 14.....	Ireland.....	1 scar.
40	December 7.....	December 25.....	New Brunswick....	1 scar.
47	December 10....	December 18.....	Ireland.....	1 scar.
32	December 8.....	December 14.....	Ireland.....	1 scar.
57	December 15.....	December 27.....	America.....	2 light scars.
35	December 17.....	December 24.....	Ireland.....	1 scar.
24	December 24.....	December 31.....	New Brunswick....	1 scar.

These cases were cared for as is customary by the department, viz., removal of patient to the hospital, thorough disinfection, vaccination and revaccination of all persons who have been in contact or exposed to the patient, and surveillance of the suspects for two weeks.

Three thousand three hundred and nineteen cases diphtheria, and 1,398 cases scarlet fever were reported during the past year. Each case has been investigated, and report made whether or not the case was properly isolated. In many cases isolation was not approved, and these were sent to the hospital.

During the past year 420 persons died without physician in attendance, and were reported to this office. In all these cases personal visits were made, bodies examined, and a probable diagnosis made before granting a permit for burial. Eleven cases have been referred to the medical examiner for investigation. Tabulated statement of cases investigated is appended :

Tabular Statement of the Cause of Deaths Investigated by Medical Inspector for the Year ending Dec. 31, 1901.

BERTILLON CLASSIFICATION.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.
I. General Diseases.													
Measles.....									1				1
Whooping-cough.....		1		1									2
Diphtheria and croup.....	3	1	1			1							6
Typhoid fever.....	1												1
Tuberculosis: <i>a.</i> of the lungs,	1	3	1	2	4	2	2	4	2	4	1	2	28
<i>b.</i> general.....	1	1						1	1			1	5
Tubercular meningitis.....								2					2
Cancer: <i>a.</i> of the stomach..								1					1
<i>b.</i> of the breast			1				1						2
<i>c.</i> others.....		1					1						2
Diabetes.....						1							1
Total from general diseases.....	6	7	3	3	4	4	4	8	4	4	1	3	51
Carried forward.....	6	7	3	3	4	4	4	8	4	4	1	37	51

STATEMENTS OF THE CAUSE OF DEATHS.— *Continued.*

BERTILLON CLASSIFICATION.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.
<i>Brought forward.....</i>	6	7	8	8	4	4	4	8	4	4	1	8	51
II. Diseases of the Nervous System and of the Organs of Sense.													
Simple meningitis.....	.....	.....	.....	1	.....	.....	.....	8	1	.....	.....	.....	5
Cerebral hemorrhage and congestion.....	1	.....	4	4	4	1	1	8	3	.....	1	1	23
Epilepsy.....	.....	.....	.....	2	.....	.....	.....	.....	.....	.....	.....	.....	2
Convulsions of infants.....	4	1	2	3	1	1	.....	1	2	1	1	3	20
Other diseases of the nervous system.....	.....	.....	.....	.....	.....	1	.....	.....	1	.....	.....	.....	2
Total of the nervous system, etc.....	5	1	6	10	5	3	1	7	7	1	2	4	52
III. Diseases of the Circulatory System.													
Organic diseases of the heart,	9	5	7	6	8	5	4	8	9	6	4	5	76
Angina pectoris.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	1
Hemorrhage.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	1
Other diseases of the circulatory system.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	1
Total of the circulatory system.....	9	5	7	6	8	6	5	9	9	6	4	5	79
IV. Diseases of the Respiratory System.													
Acute bronchitis.....	1	.....	4	1	.....	.....	3	1	.....	.....	1	.....	11
Chronic bronchitis.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1
Broncho-pneumonia.....	2	.....	.....	2	1	1	1	2	.....	.....	.....	.....	9
Pneumonia.....	2	1	3	2	2	1	.....	.....	1	2	.....	.....	14
Total of the respiratory system.....	5	2	7	5	3	2	4	3	1	2	1	.....	35
V. Diseases of the Digestive System.													
Other diseases of the stomach (cancer excepted).....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	1
Infantile diarrhoea, athrepsia	1	.....	.....	1	.....	1	20	19	4	1	1	.....	48
Dysentery.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	1
Inflammatory peritonitis (non-puerperal).....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	2
Total of the digestive system.....	2	.....	.....	1	.....	1	21	19	4	2	1	1	52
<i>Carried forward.....</i>	27	15	23	25	20	16	35	46	25	15	9	13	269

STATEMENT OF THE CAUSE OF DEATHS. — *Continued.*

BERTILLON CLASSIFICATION.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.
<i>Brought forward</i>	27	15	23	25	20	16	35	46	25	15	9	13	269
VI. Diseases of the Genito-Urinary System and Adnexa.													
Acute nephritis.....	1	.....	.....	1	.....	.....	.....	.....	2	.....	.....	.....	4
Bright's disease.....	1	1	.....	.....	.....	.....	1	1	.....	.....	.....	.....	4
Cystitis.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	1	.....	2
Total genito-urinary system, etc.....	2	1	.....	2	.....	.....	1	1	2	.....	1	.....	10
VII. Puerperal Condition.													
Other accidents of labor.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	1
Total puerperal condition..	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	1
VIII. Diseases of the Skin and Cellular Tissue.													
Phlegmon, acute abscess.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	1
Total of the skin and tissue cellular.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	1
IX. Diseases of the Organs of Locomotion.													
X. Malformations.													
Malformations.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	1
Total malformations.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	1
XI. Infantile.													
Congenital debility, icterus, and scleroma.....	4	2	4	2	1	3	1	7	9	7	4	3	47
Other diseases peculiar to infancy.....	2	.....	.....	.....	.....	1	.....	.....	.....	.....	1	.....	4
Total infantile.....	6	2	4	2	1	4	1	7	9	7	5	3	51
XII. Old Age.													
Senile debility.....	1	.....	2	.....	3	1	3	.....	2	1	3	6	22
Total from old age.....	1	.....	2	.....	3	1	3	.....	2	1	3	6	22
<i>Carried forward</i>	36	18	29	29	25	21	40	55	38	23	19	22	355

¹No deaths were examined in this group of diseases.

STATEMENT OF THE CAUSE OF DEATHS. — *Concluded.*

BERTILLON CLASSIFICATION.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.
<i>Brought forward.....</i>	36	18	29	29	25	21	40	55	38	23	19	23	355
XIII. External Violence.													
Other accidental injuries.....		2	...	...	...	...	1	...	...	...	...	...	3
Sunstroke.....		...	...	...	...	3	4	...	...	...	...	...	7
Total from external violence.....		2	...	...	...	3	5	...	...	...	...	...	10
XIV. Ill-Defined Diseases.													
Asphyxia, cyanosis.....		...	...	...	...	...	...	1	...	...	...	...	1
Unknown or not specified diseases.....	1	5	1	4	...	2	6	2	6	5	4	1	37
Total ill-defined diseases...	1	5	1	4	...	2	6	3	6	5	4	1	38
Still-births.....	...	...	1	...	1	1	2	...	...	...	...	1	6
Referred to medical examiner.....	2	...	1	...	2	...	1	1	...	2	1	1	11
Total	39	25	32	33	28	27	54	59	44	30	24	25	420

Respectfully submitted,

THOS. B. SHEA, M.D.

REPORT OF GEORGE A. SARGENT, M.D.

January 1, 1902.

To the Board of Health :

Gentlemen,— I have the honor of submitting the following report for the year ending December 31, 1901 :

At the Charity Building 12,042 persons have been vaccinated, and 2,000 certificates of vaccination have been given.

The city prison has been visited on Sundays and holidays until the latter part of November, and there have been treated there cases of abrasions, contusions, delirium tremens, epilepsy, fractures, sprain, incised wounds, lacerated wounds and scalp wounds.

At the Chardon-street Home during the year were treated cases of abscess, adenitis, bronchitis, chorea, cold, conjunctivitis, dementia, dermatitis, diphtheria, eczema, intertrigo, otitis, pregnancy, scalp wounds, syphilis, thrush and varicella.

Suffolk County Jail, 2,891 patients were treated, the number of visits required being 5,092. There were two deaths, and one patient was sent to the hospital.

A tabular statement of cases treated at the jail is hereto appended.

Respectfully submitted,

GEORGE A. SARGENT, M.D.

Tabular Statement of the Diseases Treated at Suffolk County Jail for the Year ending December 31, 1901.

DISEASES.	Remaining Jan. 1, 1901.	Treated during the year.	Recovered.	Improved.	Sent to Hospital.	Sent to Insane Asylum.	Discharged from Custody.	Deaths.	Remaining Dec. 31, 1901.
General Diseases:									
Anæmia.....		4		4					
Cold.....		71	71						
Debility.....		31		31					
Febricula.....		11	11						
Influenza.....		6	6						
Fever, intermittent.....		1	1						
Phthisis, pulmonalis.....		3		3					
Rheumatism, acute.....		7	7						
Rheumatism, chronic.....		98		98					
Organic Diseases of the Nervous System:									
Locomotor ataxia.....		2				2			
Neuritis.....		1	1						
Sciatica.....	1	2	2			1			
Functional Diseases of Nervous System:									
Delirium tremens.....		105	105						
Epilepsy.....		1		1					
Neuralgia.....		119	50	69					
Diseases of the Intellect:									
Dementia.....		4			4				
Diseases of the Circulatory System:									
Heart Disease.....		2					2		
Diseases of Bronchi.....									
Asthma.....		1		1					
Bronchitis, acute.....		54	54						
Bronchitis, chronic.....	1	1				2			
Diseases of Lungs:									
Pneumonia.....		1		1					
Pleurisy.....		5		5					
Diseases of Fauces:									
Pharyngitis.....		19	19						
<i>Carried forward.....</i>	2	549	327	213	1	4	5	2	

STATEMENT OF THE DISEASES TREATED. — *Continued.*

DISEASES.	Remaining Jan. 1, 1901.	Treated during the year.	Recovered.	Improved.	Sent to Hospital.	Sent to Insane Asylum.	Discharged from Custody.	Deaths.	Remaining Dec. 31, 1901.
<i>Brought forward.....</i>	2	549	327	212	1	4	5	2	....
<i>Diseases of Fauces. — Continued.</i>									
Post-nasal catarrh.....		2		2					
Stomatitis.....		3	3						
Tonsillitis, follicular...		10	10						
<i>Diseases of Larynx:</i>									
Laryngitis.....		2	2						
<i>Diseases of the Digestive System:</i>									
Colic.....		6	6						
Constipation.....		665	665						
Diarrhoea.....		159	159						
Dyspepsia.....		84		84					
<i>Functional Diseases of Women:</i>									
Dysmenorrhœa.....		8		8					
Menorrhagia.....		1		1					
Metrorrhagia.....		5		5					
Pregnancy.....		1					1		
<i>Diseases of Cutaneous System:</i>									
Acne.....		5		5					
Dermatitis.....		12	12						
Eczema.....		6		6					
Favus.....		1					1		
Furuncle.....		4	4						
Herpes.....	1	1	1				1		
Paronychia.....		2	2						
Phthiriasis.....		28	28						
Psoriasis.....		1		1					
Scabies.....		14	14						
Seborrhœa.....		1		1					
Tinea Versicolor.....		1					1		
Urticaria.....		1	1						
Verruca.....		1	1						
Wen.....		1					1		
<i>Diseases of Eye:</i>									
Conjunctivitis.....		24	24						
<i>Carried forward.....</i>	3	1,608	1,259	325	1	4	10	2	....

STATEMENT OF THE DISEASES TREATED.—*Concluded.*

DISEASES.	Remaining Jan. 1, 1901.	Treated during the year.	Recovered.	Improved.	Sent to Hospital.	Sent to Insane Asylum.	Discharged from Custody.	Deaths.	Remaining Dec. 31, 1901.
<i>Brought forward</i>	8	1,608	1,269	326	1	4	10	2	
Poisons:									
Opium habit.....		16		8			8		
Surgical diseases:									
Abscess.....		26	26						
Adenitis.....		5		5					
Carbuncle.....		1	1						
Chancroid.....		1		1					
Chronic Ulcer.....		4		4					
Cystitis.....		3		3					
Fistula Ani.....		1					1		
Gonorrhoea.....	4	56	10	45					5
Hæmorrhoids.....		4		4					
Hernia.....		1		1					
Mastitis.....		1	1						
Otitis.....		9	9						
Stricture.....		1		1					
Syphilis.....	4	51		45			7		3
Varix.....		1					1		
Injuries:									
Abrasions.....		46	46						
Burns.....		4	4						
Contusions.....		23	23						
Dislocations.....		1	1						
Fractures.....		9	9						
Sprains.....		19	19						
Wounds:									
Gunshot.....		1	1						
Incised.....		14	14						
Lacerated.....		26	26						
Scalp.....		57	50				7		
Total	11	1,989	1,499	442	1	4	34	2	8
Number of Vaccinations:									
From Oct. 6. to Dec. 31.....		872							
Malingering.....		29							
Grand total	11	2,890	1,499	442	1	4	34	2	8

QUARANTINE DEPARTMENT.

To the Board of Health :

GENTLEMEN, — I herewith submit the annual report of the Quarantine Department for the year ending January 31, 1902. During the past year all vessels from foreign ports, with the exception of the British maritime provinces, have been inspected, and from June 1 to November 1 all vessels from ports south of Virginia have been inspected.

During the past year 800 vessels paid quarantine fees at this port, classified as follows:

Steamers	628
Schooners	113
Barks	37
Brigs	18
Ships	4
	<hr/>
	800
	<hr/>

June 8 schooner "Zulamira," from Brava, C.V.I., was remanded to this quarantine from New Bedford at the time of the vessel's arrival. All on board were well, but between June 12 and June 17 five cases of variola developed; all among the passengers. Three of these cases were severe, the remaining two (both unprotected by previous vaccination) were very mild, having been modified by the vaccination received at the Island; in fact, one had no prodromal symptoms or any rise in temperature — a rather unusual condition. Vessel, crew and passengers were treated according to United States quarantine regulations.

June 21, steamship "Winnifred" was remanded to this quarantine from Fort Point, Me. One of the crew was found to be suffering from variola, and was removed to Gallop's Island, where he died thirteen days later, in the twenty-fifth day of the disease. Autopsy showed fatty degeneration of the heart, fatty infiltration of the liver, and cloudy swelling of the kidneys. Vessel and crew were

treated in accordance with United States quarantine regulations.

July 23, steamship "Matilda," from Progresso, was disinfected; have previously had on board two cases of suspected yellow fever.

During the month of August steamship "Ulriken," steamship "Straits-of-Dover" and yacht "Corsair" were disinfected at the request of their owners.

The following fees were collected and remitted to the City Collector:

Vessels, 500 tons and over, 689 @ \$8 =	\$5,584 00
" " " " under, 102 @ 5 =	510 00
Disinfection	140 00
Vaccination	58 00
Board	206 00
	<u>\$6,498 00</u>

The following is the yearly hospital report to January 31, 1902:

	Admitted.	Remaining Jan. 1, 1902.	Died.
Variola.....	231	38	18
Measles.....	4		1
Varicella.....	1		
Observation.....	66		
Leprosy.....	1	1	
Syphilis.....	1		
Total.....	304	39	19

From November 16, 1901, to February 18, 1902, 406 cases of variola were admitted, with a total of 34 deaths, making a mortality of .0834 per cent.

Eighty-seven were unprotected by vaccination, of whom 14 died, making a mortality of .173 per cent.

Out of the total number of cases 42 were admitted from Southampton street as convalescents. Excluding these, the mortality would be .0934 per cent.

Out of the total number of unvaccinated cases 12 were admitted from Southampton street as convalescent. Excluding these, the total mortality would be .186 per cent.

Out of all the cases admitted 5 had suffered from previous attacks, 1 of whom died.

Joint complications were rare, there being but 2. Serious kidney complications were rare, but 3 occurring. One case was complicated with empyema.

Eye complications, with the exception of conjunctivitis, were extremely rare, there being 2 cases of iritis, 2 cases of corneal ulcer and 2 of pan-ophthalmitis.

The case of leprosy admitted in November, 1900, grew progressively worse until last August, when treatment with chalmoogra oil was begun. The results seemed to be so satisfactory that it has been continued, with slight increase in dosage, ever since. At the present time both lids of the right eye are entirely healed, the tubercles on the face and in the throat are disappearing, the conjunctivæ of both eyes are clearing up, and the voice has assumed a more normal sound.

A new steam plant and kitchen was added to the detention halls, so that we were able to occupy them the latter part of December.

Respectfully submitted,

PAUL CARSON.

REPORT OF INSPECTOR OF ANIMALS.

BOSTON, February 1, 1902.

To the Board of Health :

GENTLEMEN, — I have the honor to submit the following report of the inspection of animals and dressed meat at the Brighton abattoir, and animals kept for the production of milk within the city, for the year ending January 31, 1902:

ANIMALS KILLED AT ABATTOIR.

Cattle	24,176
Calves	16,162
Sheep	36,083
Swine	496
Total	<u>76,917</u>

Table No. 1.
ANIMALS CONDEMNED.

	Number.	Weight. (Pounds.)
Cows	116	48,897
Steers		
Bulls	1	410
Calves	2	75
Sheep		
Swine	1	320
Parts of animals, including 659 livers		18,180
Total	120	62,682

Many of the smaller animals, as sheep, calves and swine, arrive at the slaughter-houses dead, and are at once prepared for rendering by the owners; such cases are not considered as seizures, and are not included in the table of animals seized and condemned.

“Parts of animals,” in the above table, refers to animals

where only a part of the same was condemned, the unmarketable portion being confined to the parts about the local lesion.

Table No. II.

DISEASES FOUND AMONG ANIMALS AFTER HAVING BEEN KILLED AND DRESSED AT THE ABATTOIR NECESSITATING THE CONDEMNING OF THE CARCASSES.

DISEASES.	Cattle.	Calves.	Sheep.	Swine.
Tuberculosis	114	.....	.....	.....
Septicemia.....	2	.....	.....	1
Actinomycosis	1	.....	.....	.....
Immatured .....	.....	2	.....	.....
Total.....	117	2	.....	1

Table No. III.

ANIMALS RECEIVED DEAD FROM THE STOCK-YARDS TO BE DRESSED FOR FOOD.

ANIMALS.	Number Received.	Number Condemned.	Weight.
Cows.....	35	2	920
Bulls	3	.....	.....
Steers	15	.....	.....
Swine	1	1	320
Total	54	3	1,240

The above table refers to animals arriving at the different stock-yards, unable to walk to the abattoir because of injury during transportation, or from what was supposed to be a slight illness; these were shot at the stock-yards, and carted to the abattoir in the ambulance.

Of the total number thirty-eight were found to be slightly injured, seven were pregnant, two had laminitis, four were overcome by heat, and three had septicemia, the last three being condemned.

ACTINOMYCOSIS.

There were found at the abattoir during the past year twenty cases actinomycosis, one of which was condemned; the remaining nineteen showed only local lesions about the head, and in these cases the heads and tongues were condemned.

TUBERCULOSIS.

The following table shows the percentage of tuberculosis in cattle killed at the abattoir:

Table No. IV.

CLASS OF ANIMALS.	Number Received.	Number Tubercular.	Percentage.
Whole number of all kinds.....	24,176	238	0.98
Cows from Eastern States.....	6,887	235	3.43
Bulls from Eastern States.....	1,713	8	0.17
Cows from Western States.....	3,548	.....	.....
Bulls from Western States.....	.....	.....	.....
Steers from Western States.....	12,078	.....	.....
Steers from Eastern States.....	.....	.....	.....

Under the head of "Cows from Eastern States" is included animals from all of the New England States.

By comparing the above table with table under the head of "Diseases found among animals after having been killed," etc., it will be seen that only 114 of the 238 cases of tuberculosis were condemned. This means that 124 of these cases were slight, and not condemnable under the act passed by the Legislature of 1898.

INSPECTION OF CATTLE.

The inspection of cattle kept for the production of milk within the city limits has been continued as heretofore. All cattle that have, upon physical examination, shown any symptoms of tuberculosis have been subjected to the tuberculin test.

Of forty-one animals that have been tested with tuberculin, eight were found tuberculous and quarantined. These were at once reported to the Board of Cattle Commissioners as required by the Public Statutes.

During this inspection four cases of actinomycosis of the udder were found and reported to the Board of Cattle Commissioners.

Upon examination of the various dairies within the city it was found that considerable improvement has been made in the condition of milk-rooms. A number of dairies, which, during the year 1900, were found in an unsatisfactory con-

dition, and which the owners refused to put in a condition satisfactory to the Board of Health, were refused a license for the year 1901.

GLANDERS.

There have been reported to the Board of Health, by veterinarians, during the past year 235 suspicious cases of glanders. Of these, seventy-two horses, on examination, were found to be affected with some non-contagious disease, and the remaining 163 with glanders. Fourteen of these cases, upon inquiry, were found to have been owned and stabled outside of Boston, or had been stabled in Boston for so short a time that no doubt existed but that the animals were infected with glanders before coming to Boston. The State Board of Cattle Commissioners were notified of such cases, that an investigation might be made by them.

In addition to the above cases of glanders reported to this office, the Board of Health, by examining all animals in stables where a case of glanders has occurred, and also in many other stables, found twenty-seven cases of glanders, or fourteen per cent. of the total number of cases, all of which would otherwise have remained in such stables, a constant danger to the other animals, for some time before being discovered by the owner.

The following table shows the number of cases of glanders for each month during the past year :

Table No. V.

MONTH.	Cases reported.	Cases found by Board of Health.	Cases found which belonged in some other city.	Cases which, upon examination, were found not to be glanders.	Actual number of cases of glanders found in city.	Number of cases of glanders which belonged in Boston.	Number of stables in which glanders was found.
January	12	2	2	1	13	11	14
February	23	3	5	3	23	18	16
March	18	6	1	7	17	16	12
April	18	5	1	4	19	18	18
May	25	5	0	13	17	17	15
June	14	0	1	7	7	6	7
July	19	1	0	2	12	12	12
August	19	2	1	6	15	14	14
September	16	0	0	6	10	20	9
October	28	3	1	8	23	22	19
November	28	0	1	6	22	21	18
December	15	0	1	3	12	11	12
Total	235	27	14	72	190	176	166

All stables in which glanders occurred during the past year have been thoroughly disinfected.

Mallein has been used to a considerable extent, particularly in such cases as were doubtful from a clinical standpoint, and where material for guinea-pig test was not available, as, for instance, where the only lesion to be discovered clinically was an enlarged sub-maxillary gland with no nasal discharge. Where it has been possible, all horses which have been associated with another animal having glanders, as, for instance, a mate working in the same team with a glandered horse, have been subjected to the mallein test. In cases where no symptoms are present and a reaction is made to mallein, the horses have been kept under strict observation by the Board of Health.

The following table shows, in a condensed form, the relation of the mallein test to the clinical diagnosis at the time of making the mallein test, and to the final diagnosis based on autopsy, guinea-pig test, or prolonged observations :

Table No. VI.

1.		2.	3.			4.	5.		6.	7.		
CLINICAL DIAGNOSIS.	Totals.	Mallein result positive.	Final clinical diagnosis on positive mallein tests.			Mallein result negative.	Final clinical diagnosis on negative mal- lein tests.		Mallein result doubtful.	Final clinical diagnosis on doubtful mallein tests.		
			Pos.	Neg.	Doubt- ful.		Pos.	Neg.		Pos.	Neg.	Doubt- ful.
Positive . . .	4	1	.....	1	.....	2	.....	2	1	1	.....	.....
Negative.....	31	3	3	.....	.....	20	.....	20	8	5	3	.....
Doubtful	89	18	16	.....	*2	13	.....	13	8	7	1	.....
	74	22	19	1	2	35	.....	35	17	13	4	.....

*These two horses are at present alive and show no symptoms of glanders; in one case the horse has been under observation for four months and in the other case for one year.

The following table is similar to Table No. VI., but includes tests for the past two years :

Table No. VII.

1.	2.		3.			4.	5.		6.	7.		
CLINICAL DIAGNOSIS.	Totals.	Mallein result positive.	Final clinical diagnosis on positive mallein tests.			Mallein result negative.	Final clinical diagnosis on negative mal- lein tests.		Mallein result doubtful.	Final clinical diagnosis on doubtful mallein tests.		
			Pos.	Neg.	Doubt- ful.		Pos.	Neg.		Pos.	Neg.	Doubt- ful.
Positive.....	68	52	49	3	.....	7	.....	7	4	3	1	.....
Negative	76	10	8	2	.....	54	.....	54	12	5	7	.....
Doubtful	114	70	58	7	5	30	.....	30	14	9	4	1
	258	132	115	12	5	91	.....	91	30	17	12	1

Column 1 shows the cases divided into positive, negative, and doubtful on clinical diagnosis.

Column 2 shows the number positive mallein tests obtained from each of these divisions.

Column 3 shows the final diagnosis on the animals, giving positive mallein test.

Columns 4 and 6 give similarly the negative and doubtful mallein results.

Columns 5 and 7 show the final diagnosis on these respectively.

The conclusions which are the same as in 1899, drawn from tables numbered VI. and VII., are as follows :

Attention is called to the fact that the conclusions are drawn as a result of the above two hundred and fifty-three cases.

1. All animals, whether suspected of glanders or not, failing to react to the mallein test, may be considered free from glanders. (See columns 4 and 5.)

2. Animals, whether suspected of glanders or not, reacting to the mallein test, may or may not be affected with glanders. (See columns 2 and 3.) It will be seen, however, that 87 per cent. of the animals giving a positive mallein reaction are affected with glanders.

3. Animals giving a doubtful reaction to the mallein test may or may not be effected with glanders. (See columns 6 and 7.)

It has been found advisable to change the standard used in the work with mallein in this department from that adopted in 1900 to one which is less complicated and of more practical value. The negative standard as adopted in 1900 (if the

rise in temperature is one degree or less the reaction is negative) does not allow for what might properly be considered a normal variation in a normal animal, with or without mallein. It has been found as a result of more than three hundred mallein tests, that not a single animal in which the temperature failed to rise above 103° on a mallein test has ever afterward shown any symptoms of glanders.

The following standard has been adopted during the past year and all mallein tables in this report are based on this standard:

1. Negative reaction is when the temperature fails to rise above 103° .

2. Doubtful reaction is when the temperature rises to a point between 103° and 104.5° .

3. Positive reaction is when the temperature rises above 104.5° .

4. If the temperature before testing be 103° or more, the reaction obtained is of little value, but even at these temperatures a rise of 2° or more usually is due to the presence of glanders.

The above standard as changed from that adopted in 1900 does not materially effect the mallein tables of any previous report.

The following table shows the comparison between the mallein test and the guinea-pig test in cases where both tests were made:

Table No. VIII.

MALLEIN TEST.	GUINEA-PIG TEST.			
	Pos.	Neg.	Unsat.	Total.
Positive	8	3 ¹	3 ²	14
Negative.....		11	1	12
Unsatisfactory.....	6	2 ³	.....	8
Totals.....	14	16	4	34

¹ Clinical evidence later showed two of these three cases to be glanders.

² Clinical evidence later showed these three cases to be glanders.

³ Clinical evidence later showed these two cases to be glanders.

RABIES.

There has been no rabies in Boston during the past year.

Respectfully submitted,

ALEXANDER BURR, M.D.V.,

Inspector and Veterinarian.

REPORT OF THE INSPECTOR OF MILK AND VINEGAR.

BUREAU OF MILK INSPECTION,
30 HUNTINGTON AVENUE, BOSTON, MASS.

To the Board of Health, Boston, Mass. :

GENTLEMEN, — I beg to submit the following report on the work of the Bureau of Milk Inspection during the year ended January 31, 1902 :

In spite of the fact that, at intervals throughout the year, one of the three collectors of samples was, by reason of illness, unable to perform his duties, the number of examinations made (15,310) was within a few hundred of the record of a year ago.

Milk samples to the number of 13,703 were collected and examined. Of this number, 7,275 were taken from milk wagons, 6,210 from shops and restaurants, and 218 were brought in by the public. The quality of the city milk supply as a whole continues to conform to the requirements of the statutes, and more. The greater relative number of poor samples are taken from the retail shops, and their analysis indicates that, in very many instances, the failure to yield the proper proportion of solids is probably due to improper and careless handling, whereby the first purchaser receives an undue share of cream and the succeeding ones a partially skimmed milk.

But few samples were found to contain coloring matter or preservatives, and no unusual form of adulteration was detected, excepting in the supply of one of the largest dealers, who, during a few days of shortage, undertook to manufacture normal milk from condensed milk, obtained, it is claimed, in New York. As the imported article consisted largely of wheat flour the milk dispensed by him as fresh country milk contained notable amounts of starch. In every case in which this and other foreign substances were found complaints were entered in the courts.

The number of samples of butter, oleomargarine and cheese examined was 448. Traffic in oleomargarine in this city is practically dead, owing to the enforcement of the law

prohibiting the sale of that substance when colored to imitate yellow butter. Two dealers were arrested for selling it in this form, and both were heavily fined. A number of restaurant keepers supply their guests with oleomargarine which they purchase in a neighboring State and receive by express. Some of these comply with the statute requiring notification that the substance served is not butter, but others are content to serve it as butter and pay a fine when brought to court.

The number of samples of vinegar examined was 1,159. Owing to keen competition in the trade and to the enforcement of the law which fixes the standard the quality continues to run high.

Following is a summary of the prosecutions made during the year :

For possession or custody with intent to sell, or sale of milk not of good standard quality	231
For possession of milk not of good standard quality and containing caramel coloring matter, with intent to sell,	2
For possession of milk not of good standard quality and containing annatto coloring matter, with intent to sell,	1
For possession of milk containing formaldehyde, with intent to sell	7
For possession of milk not of good standard quality and containing starch, with intent to sell	15
For possession of milk containing starch, with intent to sell	3
For serving oleomargarine without notification	21
For selling yellow oleomargarine	2
For exposing oleomargarine in a tub not properly marked	1
For selling oleomargarine without being licensed	1
For selling molasses vinegar as and for cider vinegar	14
For possession of adulterated cider vinegar, with intent to sell	7
For possession of adulterated vinegar with intent to sell,	4
Total complaints	<u>309</u>

The results of prosecutions were as follows :

Warrants returned without service	14
Cases <i>not pros'ed</i>	3
Acquittals	5
Convictions	287
	<u>309</u>

The fines paid amounted to \$4,688.

Summary of samples examined :

Number of samples of milk	13,703
“ “ butter, etc.	448
“ “ vinegar	1159
Total samples	<u>15,310</u>

No new legislation relative to the inspection and sale of milk, butter, cheese, oleomargarine and vinegar has been passed since the date of the last report.

The personnel of the bureau remains as before, except that Mr. Patrick H. Cannon was appointed, in December, to fill the vacancy caused by the death, in November, of Mr. Thomas A. Ball, who, for seven years, had given faithful service as a collector of samples.

Respectfully submitted,

CHARLES HARRINGTON,

Inspector.

REPORT OF THE INSPECTOR OF PROVISIONS.

To the Board of Health:

GENTLEMEN, — I have the honor to submit the following report for the year ending January 31, 1902:

Total number of packages seized and condemned, 7,396

MEATS.

Beef (tainted)	.	.	.	.	.	.	1,145 pounds.
Bear meat	"	.	.	.	.	.	220 "
Ham	"	.	.	.	.	.	550 "
Kidneys	"	.	.	.	.	.	300 "
Livers	"	.	.	.	.	.	186 "
Mutton	"	.	.	.	.	.	974 "
Poultry	"	.	.	.	.	.	7,367 "
Pigeons	"	.	.	.	.	.	37 "
Tripe	"	.	.	.	.	.	200 "
Veal	"	.	.	.	.	.	1,673 "
Veal (immatured)	.	.	.	.	.	.	10,266 "

FISH.

Fish	.	.	.	.	.	.	191,845 pounds.
Lobsters	.	.	.	.	.	.	350 "
Mackerel	.	.	.	.	.	.	1,927 barrels.
Oysters	.	.	.	.	.	.	3 "

VEGETABLES.

Apples	.	.	.	.	.	.	1 barrel.
Asparagus	.	.	.	.	.	.	108 bunches.
Beans, 7 crates, 219 baskets	.	.	.	.	.	.	2 barrels.
Berries	.	.	.	.	.	.	3,464 quarts.
Cucumbers, 9 crates, 13 baskets	.	.	.	.	.	.	2 barrels.
Corn	.	.	.	.	.	.	1 barrel.
Cabbage	.	.	.	.	.	.	103 barrels.
Cranberries	.	.	.	.	.	.	1,500 quarts.
Egg plant	.	.	.	.	.	.	1 crate.
Kale	.	.	.	.	.	.	72 barrels.
Melons, 3 baskets, 9 barrels	166 crates.
Pears,	4 barrels.

HEALTH DEPARTMENT.

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Peaches	12 baskets.
Pine-apples	21 crates.
Plums	68 "
Potatoes	104 bushels.
Spinach	1,622 barrels.
Squash	3 crates.
Tomatoes	53 "
Watermelons	1,322 "

CANNED GOODS.

Tomatoes	40 cans.
Corn	38 "

CONVICTION.

April 23, 1901.

Rebecca Shine, doing business at 55 Salem street, was arrested, convicted and fined fifteen dollars (\$15) for selling tainted poultry to Augustus Cohen, of 174 Main street, Charlestown.

Respectfully submitted,

JOHN C. GROUSE,

Inspector.

REPORT OF SUPERINTENDENT OF PEDLERS.

CITY BUILDING, NORTH GROVE STREET,
BOSTON, February 1, 1902.

To the Board of Health:

GENTLEMEN, — I have the honor to submit the following report of the work performed by this branch of the Health Department for the year ending January 31, 1902:

One hundred and nine (109) licenses were granted to collectors of bones, grease, etc., and the renewals on same numbered in February, 86; March, 84; April, 84; May, 82; June, 80; July, 80; August, 83; September, 86; October, 84; November, 82; December, 84; January, 81. Persons who sell articles mentioned in chapter 65, Public Statutes, are assigned numbers by the Board of Health — Revised Ordinances 1898, chapter 47, section 86 — and certificates were issued to pedlers in February, 510; March, 35; April, 81; May, 74; June, 66; July, 44; August, 31; September, 28; October, 21; November, 15; December, 11; January, 13. Vehicles, receptacles and numbers approved (chapter 47, section 88) were, in March, 496; April, 482; May, 509; June, 521; July, 503; August, 482; September, 517; October, 473; November, 494; December, 472; January, 434.

The vehicles and receptacles used by persons licensed by the Board of Health are in good condition.

Nine persons complained of in court were convicted and paid fines amounting to \$47. The City Collector received \$2,434 for licenses, \$2,150 of which was paid for city licenses.

The licenses granted during the year were:

Licenses to remove bones, grease, etc.	109
Numbers assigned by the Board of Health	929
Licenses granted by the Secretary of State, city	86
“ “ “ “ “ “ “ county	71
“ “ “ “ “ “ “ tax-payers,	103

Respectfully submitted,

JOHN McLOUGHLIN,
Superintendent of Pedlers.

REPORT OF SUPERINTENDENT OF CITY MORGUE.

BOSTON, February 1, 1902.

To the Board of Health:

GENTLEMEN, — I have the honor to report that the year ending January 31, 1902, there were received by me, and cared for, bodies of 132 persons deceased; of these forty-five were unknown at time of reception, twenty-eight were subsequently identified.

There were made by the Medical Examiner and his associate twenty-seven autopsies at which I assisted.

I have the honor to be,

Very respectfully,

FREDERICK L. BRIGGS.

APPENDIX.

REGULATIONS OF THE BOARD OF HEALTH.

In accordance with authority contained in section 65, chapter 75 of the Revised Laws of Massachusetts, the following regulations have been adopted from time to time by the Board of Health and are still in force :

HIDES AND HORNS.

May 7, 1875.

Ordered, That from the first day of April to the first day of November no green hides nor horns shall be cured or stored or be suffered to remain within the limits of the city without a written permit from the Board of Health. This order to take effect on the 31st inst.

REMOVAL OF MANURE.

May 10, 1875.

Ordered, That no manure shall be removed except in a tight, canvas-covered vehicle, with the covering so secured to the sides and ends of the vehicle as to prevent the manure from being dropped or left in any street or way of the city in process of removal, and not loaded in or upon any street, lane, alley, or passageway or upon or across any sidewalk.

LEAKY CARTS.

May 12, 1875.

Ordered, That no person removing manure, house offal, swill, or filth of any kind, shall suffer it to leak or escape from the vehicle by him owned or driven, in or upon any street, court, square, lane, alley, wharf, or public enclosure, in the City of Boston.

BURIAL GROUNDS.

September 10, 1875.

Ordered, That on and after October 1, 1875, the Superintendent, or any person authorized to receive or bury the body of any deceased person in any burial ground within the limits of the City of Boston, shall as often as once in each week,

report to the Board of Health in said city, the number of burials in the ground under his charge during the preceding week, together with the date of the burial, the number of the permit for burial, the name of the deceased and the name of the undertaker or other person having charge of the body when brought to said ground for burial.

RENDERING.

November 6, 1875.

By virtue of the authority given by chapter 36 of the General Statutes, the Board of Health of the City of Boston makes the following regulation: That on and after November 30, 1875, the trade or employment of slaughtering cattle, calves, sheep or swine, or of rendering tallow, or other refuse animal matter, shall not be carried on within the limits of the City of Boston, except on the islands of the harbor or at the abattoir in the Brighton district, or at such other place or places as may hereafter be assigned by the Board of Health.

August 7, 1878.

The Board of Health of the City of Boston hereby forbids the exercise, after date, of the trade or employment of manufacturing fertilizers or guano from fish or other animal matter within the limits of the City of Boston, except on the islands, at the abattoir in the Brighton district, or at such other place or places as may have been or may hereafter be assigned by said board; such trade or employment being in the opinion of the Board a nuisance, hurtful to the inhabitants, the exercise of which is attended by noisome and injurious odors.

OFFENSIVE TRADES.

August 7, 1878.

Ordered, That, after this date, the exercise of the trade or employment of manufacturing fertilizers or guano from fish or other animal matter within the limits of the City of Boston, except on the islands in the harbor, at the abattoir in the Brighton district, or such other places as may have been or may hereafter be assigned by said Board, such trade or employment being in the opinion of the Board a nuisance, hurtful to the inhabitants, the exercise of which is attended by noisome and injurious odors.

October 13, 1896.

The Board of Health hereby forbids the exercise of the trades or employments of slaughtering animals, rendering animal-matter (except fresh tallow), manufacturing fertilizers, mixing or storing refuse, animal or vegetable substances,

smoking fish or meat, refining oils, making varnish, asphaltum, glue, gas, gasoline, or any burning fluid within the limits of the City of Boston, except at such place or places as may be assigned by said Board; such trades or employments being nuisances, hurtful to the inhabitants of said city, dangerous to the public health, attended by noisome and injurious odors, and otherwise injurious to the estates of said inhabitants.

August 22, 1901.

The Board of Health hereby forbids the exercise of the trades or employments of slaughtering animals, rendering animal-matter (except fresh tallow), manufacturing fertilizers, mixing or storing refuse, animal or vegetable substances, smoking fish or meat, or the keeping, sorting or breaking or otherwise handling of rotten or offensive eggs, refining oils, making varnish, asphaltum, glue, gasoline, or any burning fluid within the limits of the City of Boston, except at such place or places as may be assigned by said Board; such trades or employments being nuisances, hurtful to the inhabitants of said city, dangerous to the public health, attended by noisome and injurious odors, and otherwise injurious to the estates of said inhabitants.

STREET SPRINKLING, ETC.

August 1, 1876.

That on and after August 1, 1876, no filthy or offensive water shall at any time be sprinkled, poured, thrown, or put upon any street of the city.

GLANDERS AND FARCY.

November 7, 1877.

No horse or other animal having a disease known as glanders or farcy shall be driven or brought into the city.

The owner, agent or other person in charge of an animal so affected within the city, shall forthwith report the fact to the Board of Health, together with the name of such owner, and the place where the animal is kept, and it shall be disposed of under the direction of said Board.

Any veterinary surgeon, or other person, called to examine or attend such animal, shall within twenty-four hours report to said Board the above facts and the type of the disease.

SPRINKLING OF SALT.

February 27, 1880.

Whereas, In the judgment of the Board of Health, the sprinkling of salt, or a mixture of salt, with other matter,

upon the public streets, ways, and sidewalks of the city, while snow or ice overlies the surface of the same; is a cause of sickness and injurious to the public health; therefore,

Ordered, That no salt, nor mixture of salt with other matter, shall hereafter be sprinkled, scattered, or put upon any public street, way, or sidewalk of the city, while snow or ice overlies the surface of such street, way, or sidewalk, without the written permission of the Board of Health.

PUBLIC FUNERALS.

November 21, 1882.

Whereas, The diseases designated as small-pox, scarlet fever, diphtheria, and typhus fever are contagious and dangerous to the public health, and have been, and may easily be, contracted at funerals from dead bodies or apartments which have been infected by such diseases; it is, therefore,

Ordered, That from and after this date no public funerals shall be held over the remains of any person having died of small-pox, scarlet fever, diphtheria, or typhus fever, without the written permit of the Board of Health, and under such regulations as may prevent the spread of either of said diseases.

Ordered, further, That the remains of persons dying of either of said diseases shall at once be placed in a tight or sealed coffin, and shall not thereafter be exposed to view or disturbed except for burial.

UNDERTAKERS.

January 3, 1890.

The following Statute Law and the Regulation of the Board of Health is published for the information of undertakers and others having charge of the burial of bodies:

CHAPTER 124, COMMONWEALTH OF MASSACHUSETTS, IN THE YEAR 1883.

AN ACT RELATING TO THE REMOVAL AND TRANSPORTATION OF CERTAIN BODIES FOR BURIAL.

Be it enacted by the Senate and House of Representatives in General Court assembled, and by the authority of the same, as follows:

SECTION 1. Section 5 of chapter 32 of the Public Statutes, relating to the burial or removal of bodies for burial, is amended by inserting in the eleventh line thereof, after the word "bury," the words "or remove."

SECT. 2. No railroad corporation, or other common carrier or person, shall convey or cause to be conveyed, through or from any city or town in this Commonwealth, the remains of any person who has died of

small-pox, scarlet fever, diphtheria, or typhoid fever, until such body has been so encased and prepared as to preclude any danger of communicating the disease to others by its transportation, and no local registrar or clerk shall give a permit for the removal of such body until he has received from the Board of Health of the city, or the Selectmen of the town where the death occurred, a certificate stating the cause of death, and that said body has been prepared in the manner set forth in this section, which certificate shall be delivered to the agent or person who receives the body.

SECT. 3. This act shall take effect upon its passage.

REGULATION.

IN BOARD OF HEALTH, January 3, 1890.

In pursuance of the above law the Board of Health makes the following regulation :

Ordered, That the bodies of all persons dying from small-pox, diphtheria, membranous croup, scarlet fever, or typhus fever must immediately be prepared for the coffin, wrapped in a sheet saturated in a 10% solution of chloride of zinc and placed in a coffin which must be made absolutely tight, and which must not be reopened.

INSTRUCTIONS. — It will be necessary for undertakers to first comply with the above Law and Regulation, and then certify the same to this Board. The Board of Health will thereupon issue the required certificate.

Blanks for the undertakers' use will be furnished at this office.

INSTRUCTIONS TO SUPERINTENDENTS OF CEMETERIES AND UNDERTAKERS.

October 1, 1899.

In disinterring the remains of persons who have died from any infectious disease the following instructions must be followed :

After excavating the earth to within six inches of the coffin or box containing an infected body, the box and earth upon it must be saturated with a solution of fresh chloride of lime (one-half pound to a gallon of water), and when the box containing the body is raised or handled it must be thoroughly washed with the same solution. No such body shall be removed except in a tightly sealed and suitable box.

No person will be allowed to disinter or remove the remains of any person who has died of small-pox without first having been vaccinated very recently and to the satisfaction of the Board of Health.

WALL DRAPERIES.

October 11, 1898.

At a meeting of the Board of Health, this day, the following regulation was passed :

"The Board of Health hereby adjudges that the use of 'Wall Draperies' at funerals is a source of filth and cause of sickness, and hereby orders: That the use of such draperies in any room or place used for a funeral or for the preparation or retention of any human body before or in connection with such funeral be, and hereby is, forbidden."

Cows.

July 28, 1876.

Ordered, That no person shall keep or allow to be kept in any building or any premises of which he may be the owner, lessee, tenant or occupant, more cows than at the rate of one for each 3,000 square feet of land (in or near the built up portions of the city) without a written permit of the Board of Health. Every person keeping a cow shall cause the place where it is kept to be well ventilated and drained and kept at all times in a cleanly and wholesome condition.

April 26, 1892.

Whereas, Cows' milk is one of the most common and necessary articles of food, and is oftentimes seriously impaired in usefulness and rendered dangerous to health by the want of proper care in its production or subsequent treatment or handling, it is therefore ordered that the following regulation be, and is hereby, adopted:

SECTION 1. No person shall use any building as a stable for cows unless it contains at least 1,000 cubic feet of space for each animal, is well lighted and ventilated, has tight roof and floors, good drainage, a supply of pure water, and all other necessary means for maintaining the health and good condition of the cows, and has been approved by the Board of Health.

SECT. 2. Every person using any such building shall keep the same, and the premises connected therewith, and all land used for pasturage of the cows, clean and free from filth.

SECT. 3. Every person keeping a milch cow shall permit it to be examined from time to time, as to its freedom from disease, by a veterinarian designated by the Board of Health.

SECT. 4. No person having an infectious disease, or having recently been in contact with any such person, shall milk cows or handle cans, measures, or other vessels, used for milk intended for sale, or in any way take part or assist in handling milk intended for sale, until all danger of communicating such disease to other persons shall have passed.

SECT. 5. No person shall sell or use for human food the milk of a diseased cow, or permit such milk to be mixed with other milk, nor until it has been boiled shall sell or use such milk, or any mixture of such milk, for food of swine or other animals.

MILK.

December 22, 1898.

Whereas, In the opinion of the Board of Health infectious diseases are spread by the distribution of milk produced, stored, and distributed under improper conditions; it is, therefore,

Ordered, That the following regulations be, and hereby are, adopted :

ARTICLE I.

SECTION 1. All persons in the City of Boston engaged in the production of milk for sale, or in the business of selling, delivering, or distributing milk in said city, shall annually on the first day of May, or within thirty days thereafter, make written application to the Inspector of Milk, on forms prescribed by the Board of Health, for a license.

SECT. 2. No person in said city shall engage in the business of producing milk for sale, or in the sale or distribution of milk in the City of Boston, without a license so to do, under these regulations and such other conditions as the Board of Health may impose; said license to be revoked if the licensee fail to comply with the conditions of his license or the regulations of this Board.

SECT. 3. The conditions under which every cow is kept whose milk is brought into the City of Boston, or kept, delivered, distributed, sold, or offered for sale in said city, shall be made known by the licensee to the Inspector of Milk in such detail as the Board of Health may require, and shall be approved by said Board; and no milk except that derived from such cow shall be brought, kept, delivered, distributed, sold, or offered for sale in said city.

SECT. 4. No milk shall be sold, offered for sale, or distributed in the City of Boston unless the cows from which it is derived have, within one year, been examined by a competent authority, and shown to be free from diseases dangerous to the public health; but this shall not be construed as forbidding the sale or use of milk from cows not tested with tuberculin.

SECT. 5. All persons having a permit or license to sell, deliver, or distribute milk in the City of Boston, shall keep a copy of the license constantly posted in a conspicuous place

on the premises, and shall have his name and the number of his license marked in plain uncondensed Gothic letters, not less than one inch in height, on vehicles used by him in the conveyance and sale of milk.

ARTICLE II.

SECTION 1. No milk for sale or distribution shall be stored in that portion of a building which is used for the stabling of horses, cows, or other animals, or for the storing of manure, or in any room used in whole or in part for domestic or sleeping purposes.

SECT. 2. No person in the City of Boston engaged in the business of producing milk for sale, and no person engaged in the business of storing or delivering milk in said city, shall store, cool, or mix said milk in any room which is occupied by horses, cows, or other animals. All rooms in which milk is stored, cooled, or mixed, shall be provided with tight walls and floors and kept constantly clean. The walls and floors of said rooms to be of such a construction as to allow easy and thorough cleansing. The room or rooms aforesaid shall contain proper appliances for washing or sterilizing all utensils actually employed in the storage, sale, or distribution of milk, and all such apparatus and utensils shall be washed with boiling water or sterilized by steam regularly after being so used.

SECT. 3. No urinal, water-closet, or privy shall be located in the rooms called for in the preceding section, or so situated as to pollute the atmosphere of said rooms.

SECT. 4. All milk produced in the City of Boston for sale shall be strained, cooled or stored as soon as it is drawn from the cow.

ARTICLE III.

SECTION 1. Milk kept for sale in any store, shop, restaurant, market, bakery, or other establishment, shall always be kept in a covered cooler, box, or refrigerator, properly drained and cared for, and while therein shall be kept tightly closed and only in such locations and under such conditions as shall be approved by the Board of Health.

ARTICLE IV.

SECTION 1. All cans, bottles, or other vessels of any sort, used in the retail sale, delivery or distribution of milk to the consumer, must be cleaned or sterilized before they are again used for the same purpose, and it shall be deemed a sufficient

reason for forfeiture of license for any milk dealer to fail so to do.

SECT. 2. No person shall use in any way a milk vessel for any other substance than milk, and any licensed milk dealer who shall so misuse such vessel shall be liable to forfeiture of license.

ARTICLE V.

SECTION 1. Every person engaged in the production, storage, transportation, sale, delivery, or distribution of milk shall immediately on the occurrence of any case or cases of infectious disease either in himself or in his family, or amongst his employees or within the building or premises where milk is stored, sold or distributed, notify the Board of Health, and at the same time shall suspend the sale and distribution of milk until authorized to resume the same by the Board of Health. No vessels which have been handled by persons suffering from such diseases shall be used to hold or convey milk until they have been thoroughly sterilized.

MILK.

August 31, 1900.

At a meeting of the Board of Health, this day, the following regulation was adopted :

“ No milk drawn from a cow in the City of Boston within forty-eight hours after said cow is brought into said city shall be sold or used for human food, and all milk drawn from any cow within forty-eight hours after said cow is brought into the city shall be destroyed within one hour after it is drawn from the cow.”

RECEPTACLES FOR GARBAGE, ETC.

September 6, 1892.

Ordered, That no person, unless authorized so to do, be allowed to handle, disturb, or remove the contents of any receptacle for garbage or rubbish of any kind placed in the yards, passageways, or public streets.

DESTRUCTION OF CLOTHING, ETC.

September 10, 1892.

Ordered, That hereafter no articles of clothing or bedding in use shall be thrown overboard from any vessel in Boston harbor without the written consent of the Board of Health or the Quarantine Physician ; nor shall any such articles be removed from any vessel at her dock without such permis-

sion ; such articles shall no longer be brought to the city to be destroyed, but shall be burned in the harbor, under the supervision of the Quarantine Physician, in the furnaces of the steamers.

OYSTER SHELLS.

October 17, 1892.

Whereas, The storing and handling of oyster shells near business and residential districts are attended by noisome and injurious odors, it is hereby ordered that no oyster shells shall be kept in or removed from any building, yard, or other place within the built-up portions of the city, except by written permission from the Board of Health, and only at such times and in such manner as shall be prescribed in said permit.

QUARANTINE.

MARCH 4, 1893.

At a meeting of the Board of Health, this day, it was ordered that the several quarantine regulations, now in force at this port, be revised so as to read as follows :

Ordered, That any vessel arriving at this port which has on board at the time of her arrival, or has had during her passage to this port, any sickness of a contagious, infectious, or doubtful character, which may be dangerous to the public health, or which has come from or has been in any port or place which has been epidemically infected with any contagious or infectious disease within the six months next preceding such arrival, or has on board any merchandise which has come by transshipment from any such infected port or place within the six months next preceding, or has on board any immigrants (except from British America), shall be anchored at quarantine.

Infected persons found on such vessels shall be removed to the hospital on Gallop's Island, and there detained until all power to infect others shall have ceased. Cargoes and personal baggage, which in the opinion of the Port Physician or the Board of Health may be infected, shall be removed to Gallop's Island and there disinfected, when such disinfection cannot be properly done on board the vessels or on lighters.

All immigrants, on arrival at quarantine, shall be subjected to examination as regards their freedom from contagious or infectious disease and their protection from small-pox.

All persons under ten years of age who have not been successfully vaccinated, and all persons over ten years of age who have not recently been successfully vaccinated or revaccinated, shall be considered as unprotected from the effect of

the contagion of small-pox, persons having had an attack of small-pox excepted.

All persons not so protected shall be vaccinated or subjected to a quarantine of fifteen days' observation.

All old rags, paper stock, hair, feathers, hides, skins, wool, and similar materials which are liable to convey disease germs must be accompanied by satisfactory certificates as to their place of collection and packing for shipment.

No article of clothing or bedding in use shall be thrown overboard from any vessel in Boston harbor without the written consent of the Board of Health or the Quarantine Physician; nor shall any such article be removed from any vessel at her dock without such permission; all such articles which are to be destroyed shall be burned in the harbor under the supervision of the Quarantine Physician, in the furnaces of the steamers.

No vessel shall leave quarantine, nor shall her cargo, or any part thereof, be discharged, nor any person be allowed to go on board or to leave her while in quarantine, without the written permit of the Port Physician, who is hereby authorized and instructed to take such measures with regard to said vessel, cargo, and persons, as, in his judgment, the public health may require.

It is also hereby ordered that, during June, July, August, September, and October, of each year, subject to such changes as circumstances may from time to time require, all vessels arriving in this harbor from the following ports shall stop at the Quarantine Station, viz.: All vessels from any port in Europe, from the Western, Madeira, Canary, or Cape de Verde Islands; from the Mediterranean or Straits thereof, from the west coast of Africa, or around the Cape of Good Hope; from the West India, Bahama, or Bermuda Islands; from any American port south of Virginia, including Central and South America; and vessels arriving from any place in the United States or British America, where they may have touched on their way from any foreign port or place above named.

No such vessel shall leave quarantine or unload her cargo or any part thereof, nor shall any person go on board or leave the vessel while in quarantine without the written permit of the Port Physician, who is hereby authorized and instructed to take any measures in regard to such vessels as, in his judgment, the public health may require.

The Port Physician is hereby authorized and instructed to demand and receive the quarantine fees which are hereby made and established by this Board, and which are as follows :

For examination of vessels of 500 tons and upward (registration tonnage), eight dollars.

For examination of vessels under 500 tons (registration tonnage), five dollars.

For disinfecting vessels, from ten to fifty dollars.

For baths and disinfecting personal clothing and baggage, one dollar for each person.

For vaccination, twenty-five cents for each person.

For board of patients in hospital, ten dollars a week.

Such fees to be, by the Port Physician, paid to the City Treasurer.

REMOVAL OF RUBBISH, ETC.

September 8, 1876.

Ordered, That no person removing earth, dirt, sawdust, soot, ashes, cinders, shavings, hair, shreds, manure, oysters, clams or lobsters, waste water, or any animal or vegetable substance, house offal, swill, rubbish, or filth of any kind whatsoever, shall suffer it to leak, escape, or drop from any vehicle by him owned or driven, into or upon any street, court, square, lane, alley, wharf, or public enclosure in the City of Boston.

DEPOSIT OF REFUSE.

March 30, 1893.

Voted, That, whereas, in the opinion of the Board of Health, the use of refuse materials in filling ponds and bodies of water and wet lands is a nuisance, source of filth, and cause of sickness, it is therefore

Ordered, That no person shall throw into any pond or body of water or upon any land which at any time is covered with tide-water, within the limits of the city, any refuse, animal or vegetable matter, or any perishable material or rubbish or filth of any kind whatsoever, between the first day of April and the first day of November, except in accordance with a written permit issued from the Board of Health to the owner of such pond or land, and no owner of such pond or land shall refuse or neglect to remove therefrom any refuse or filth hereinbefore described which shall be thrown or placed in or upon the same within the period hereinbefore specified.

REFUSE.

July 31, 1900.

At a meeting of the Board of Health, this day, it was voted to amend the regulation prohibiting the removal of refuse, etc., passed by this Board September 8, 1876, so that it will read as follows:

Ordered, That no person removing earth, dirt, sawdust, soot, ashes, shavings, hair, shreds, manure, oysters, clams, or lobsters, waste water, or any animal or vegetable substance, house offal, swill, rubbish or filth of any kind whatsoever, shall suffer it to leak, escape or drop from any vehicle by him owned or driven into or upon any street, court, square, lane, alley, wharf or public enclosure in the City of Boston, or suffer offensive odors to escape from such vehicles to the discomfort or annoyance of people residing, doing business or travelling on the route over which such vehicles are driven. Nor shall any person engaged in collecting any of the articles heretofore enumerated suffer any vehicle to remain standing in any street, court, square, lane, alley, wharf or public enclosure in the City of Boston, except for the purpose of removing the refuse so collected, for a longer time than ten consecutive minutes.

STORAGE OF REFUSE.

January 21, 1901.

At a meeting of the Board of Health, this day, it was voted to amend its regulation, passed February 28, 1899, prohibiting the storage of rags, old paper, and other refuse material in any building used as a dwelling, so as to read as follows :

Whereas, It is a practice in this city to collect rags, old paper, junk, and other refuse material, from dumping-grounds, streets, and other places, and to store, sort, and otherwise handle the same within dwellings, and

Whereas, In the opinion of this board, such rags, old paper, junk and other refuse material are a source of filth, and capable of conveying infectious diseases from person to person, and of otherwise creating sickness ; therefore

Ordered, That on and after this date, no rags, old paper, junk, or other refuse material, gathered or recovered from any source, shall be brought into or allowed to remain within any building used as a dwelling.

FILLING FOR PONDS AND WET LANDS.

April 10, 1898.

Whereas, In the opinion of the Board of Health, the use of refuse materials in filling ponds and bodies of water and wet lands is a nuisance, source of filth, and cause of sickness, it is therefore ordered that no person shall throw into any pond or body of water, or upon any land which at any time is covered with tide-water, within the limits of the city, any

refuse, animal or vegetable matter, or any perishable material or rubbish or filth of any kind whatsoever, between the first day of April and the first day of November, except in accordance with a written permit issued from the Board of Health to the owner of such pond or land, and no owner of such pond or land shall refuse or neglect to remove therefrom any refuse or filth hereinbefore described which shall be thrown or placed in or upon the same within the period hereinbefore specified.

TEXAN CATTLE.

July 29, 1893.

Whereas, Northern and Western cattle exposed to those coming from Texas, or to the premises which have been used by Texan cattle, are likely to contract a disease known as Texas fever among cattle, it is therefore ordered that none of the cattle arriving from Texas shall be driven over any road or across any lands which are used or liable to be used by other cattle, nor in any way exposed to such other cattle within the limits of Boston, except within the yards immediately connected with the abattoir.

STORAGE OF FRUIT.

August 3, 1893.

No person shall store or keep or allow to be stored or kept in any building of which he is the owner or occupant, and which is in use in whole or in part as a dwelling-house, any fruit or merchandise, except in accordance with a written permit from the Board of Health.

KILLING OF POULTRY.

July 16, 1896.

That no live chickens, geese, ducks, or other fowls shall be brought into, or kept, or held, or offered for sale, or killed or plucked, in any place in the City of Boston, without a permit thereof in writing from the Board of Health, which shall be subject to revocation by said Board at any time.

PEDLERS.

The following laws have been passed by the State and city for the government of pedlers:

No person shall sell any articles to any person on a public street or go from house to house selling articles, or cry his goods in the street and ways, unless he is a minor, licensed by the Clerk of Committees to sell articles, or he has received

a permit from the Superintendent of Streets to sell articles on a public street, recorded his name and place of residence with the Board of Health, and receive from said board a record number.

No such permit or number shall be given to or used by any person unless the person sells only the following articles, produced or grown in the United States, viz.: Brooms, live animals, fruits, provisions, agricultural products or implements, hand tools used in making boots and shoes, fuel, newspaper, books, pamphlets, or the products of his own labor or the labor of his family other than jewelry, wines, spirituous liquors, indigo, playing cards, or feathers; or the person has received a license as Hawker and Pedler from the Secretary of the Commonwealth *and* — is an honorably discharged soldier or sailor of the late war, *or* — is over seventy years of age, *or* — has paid the City Treasurer twenty-five dollars, *or* — is qualified to vote and has paid a tax on his stock in trade in Boston, *or* — is licensed by said Secretary as a Hawker and Pedler throughout the Commonwealth or throughout the County of Suffolk.

No person selling articles shall refuse or neglect to exhibit his permit, license, and certificate whenever the same is demanded by any public officer.

No person shall sell spirituous liquors, wines, jewelry, feathers, playing cards, or indigo.

No person shall have in his possession, with intent to sell, fish of any kind, unless they are kept in covered stalls or fish-boxes, or in covered carts, well secured from the rays of the sun, nor any fish other than flounders, smelts, or other small fish, salmon, or shad, unless they have been cleansed of their entrails and other refuse parts.

No person selling articles shall carry them in any vehicle or receptacle, unless the same is neat, clean, and free from leaks, and has printed upon it his name, the number of his license, and the number given him by the Board of Health, in letters and figures at least two inches in height.

No person selling articles shall carry them in any manner that will injure or annoy the public health or comfort.

No person selling articles shall cry his wares to the disturbance of the peace and comfort of the inhabitants.

No person shall place or permit to remain in any street for more than ten minutes any of his goods or articles without a permit from the Superintendent of Streets.

No person shall, on foot in any street, carry or display any show-card, placard, or sign without a permit from the Superintendent of Streets.

No person selling articles shall stop or stand with a cart, wagon, or other vehicle for the purpose of hawking, pedling, or selling goods, wares, merchandise, fruit, or other articles, between the hours of eight o'clock A.M. and half-past six o'clock P.M., in or occupy any part of the following streets, ways, or squares, namely, Haymarket square, Sudbury street, Court street from Sudbury street to Scollay square, Scollay square, Tremont street from Scollay square to Eliot street, Eliot street from Tremont street to Washington street, Washington street from Eliot street to Franklin street, Franklin street from Washington street to Devonshire street, Devonshire street from Franklin street to Milk street, Milk street from Devonshire street to Pearl street, Post Office square, Water street to Washington street, State street, between Merchants row and Devonshire street, and Washington street from Adams square to Haymarket square, or any of the streets, ways, or squares included within the territory bounded as above described, or except in accordance with an order of the Board of Aldermen, stop or stand in, or occupy any part of the streets, ways, and squares in the city proper, north of Massachusetts avenue, with a hand-cart or wheelbarrow, for the purpose of hawking, pedling, or selling any goods, wares, or merchandise, fruit, or other articles between the hours of eight o'clock A.M. and half-past six P.M.

No person shall sell or expose for sale by public auction any articles except in such place as is expressly described or set fourth in his license or permit.

See Revised Laws of Massachusetts, chap. 65.

CONTAGIOUS DISEASES.

March 10, 1897.

At a meeting of the Board of Health, this day, it was voted to amend the regulation of July 1, 1895, respecting contagious diseases, so to read as follows:

1. Whoever is infected with small-pox, scarlet fever, diphtheria, or membranous croup, shall immediately proceed to some isolated place or room designated by the Board of Health, and no person who has been so affected shall leave such place or room and no article shall be removed from such place or room until the Board of Health shall certify in writing that all danger of communicating such disease to others is passed.

2. Every parent or guardian of any child or ward infected with small-pox, scarlet fever, diphtheria, or membranous croup, shall immediately cause such child or ward

to be conveyed to some isolated place or room approved by the Board of Health, and no parent or guardian shall permit such child or ward to remove from such place or room until the Board of Health shall find and certify in writing that all danger of communicating such disease to others has passed.

3. No person other than the attending physician, nurse, and agents of the Board of Health, shall enter, *nor shall any dog, cat, or other animal be allowed to enter* any apartment or other place set apart for the treatment of small-pox, scarlet fever, diphtheria, or membranous croup, until the Board of Health shall certify in writing that such apartment or place has been satisfactorily disinfected.

4. No person having the care of any other person who has been infected with small-pox, scarlet fever, diphtheria, or membranous croup, shall advise or permit such other person to leave any place designated by the Board of Health as a place of isolation of such infected person before said Board of Health shall have certified in writing that such person can leave such designated place without danger to others.

5. No physician who has been in attendance upon any person who has been infected with small-pox, scarlet fever, diphtheria, or membranous croup, shall advise or knowingly permit such person to leave any place designated by the Board of Health as a place of isolation of such infected person before said Board of Health shall have certified in writing that such infected person can leave such place without danger to others.

RULES FOR LODGING-HOUSES.

March 22, 1898.

The following rules have been adopted by the Board of Health for the government of lodging-houses:

1. The means for light and ventilation must be satisfactory to the Board of Health and beyond the control of lodgers.

2. All floors and stairways must be sound, smooth, and either painted or shellacked.

3. There shall be allowed no less than 300 cubic feet of space to each lodger in sleeping rooms.

4. Open and spacious dormitories will be preferred.

5. Single or small rooms will be allowed only in exceptional cases, and then only with fireproof partitions.

6. No carpeting will be allowed on floors or stairways.

7. There shall not be less than two horizontal feet between the sides of any two beds.

8. All bedsteads must be single and of iron.

9. Blankets will be required and "comforters" will be prohibited.

10. Mattresses must be covered with a waterproof covering.

11. No person will be allowed to retire or sleep in his day clothing.

12. No person who is not clean will be allowed to retire without a bath.

13. Water-closets (one to every 20 lodgers), lavatories and shower bath, with hot and cold water, all with open plumbing, must be furnished on each floor, and the floors to same shall be of marble, slate, or concrete.

14. All movable receptacles for excretions are prohibited.

15. Smoking in sleeping rooms is prohibited.

16. All stairways, fire-escapes, and other means of exit in case of fire must be in accordance with the statutes and ordinances on that subject, and to the satisfaction of the Building Commissioner.

17. Stoves for heating will be allowed only under the most favorable conditions for safety.

18. The use of portable kerosene lamps is prohibited.

19. A reliable person or persons must be in attendance at all hours of the night.

BARBER SHOPS.

May 4, 1900.

At a meeting of the Board of Health, this day, the following regulation respecting barber shops was adopted :

The place of business, together with all the furniture, shall be kept, at all times, in a cleanly condition.

Mugs, shaving brushes and razors shall be sterilized by immersion in boiling water after every separate use thereof.

A separate, clean towel shall be used for each person.

Alum, or other material, used to stop the flow of blood, shall be so used only in powdered form, and applied on a towel.

The use of powder-puffs is prohibited.

The use of sponges is prohibited.

Every barber shop shall be provided with running hot and cold water.

No person shall be allowed to use any barber shop as a dormitory.

Every barber shall cleanse his hands thoroughly immediately after serving each customer.

ICE DEALERS.

May 9, 1900.

Ordered, That each and every party selling ice in Boston fill out over the signature of the chief clerk or other responsible officer of the party and return to the Board of Health at its office, Old Court House, Boston, Mass., on or before June 1 of the year, a blank of the following form :

1. Give the name and situation of each and every river, brook, pond or lake from which you cut ice, and the approximate number of tons you cut annually from each.

2. Give the name of each and every party from whom you take ice to sell and the approximate number of tons taken annually from each.

3. Give the situation of each and every storehouse, depot, agency, railroad terminal, or other place from which you take your ice into vehicles for distribution in Boston.

4. Give the name of each and every party distributing ice in Boston to whom you regularly or occasionally supply ice, and the approximate number of tons supplied to each.

5. Do you classify the ice you sell as "For drinking purposes," "For cooling purposes only, not to be used for drinking," etc.?

6. Do you sell "snow ice"?

7. Do you flood your ice field?

8. Do you have chemical analyses made for you of the water used or of the ice therefrom?

9. Do you take precautions to maintain your sources of supply in good, clean and wholesome condition, and, if so, what?

POULTRY.

July 24, 1900.

At a meeting of the Board of Health, this day, the law relating to the killing of poultry, passed July 16, 1896, was amended so as to read as follows :

No live chickens, geese, ducks or other fowls shall be brought into, or kept, or held, or offered for sale, or killed or plucked, in any place in the City of Boston, without a permit therefor, in writing, from the Board of Health, which shall be subject to revocation by said Board at any time.

No carcass of any hen, chicken, turkey or goose shall be brought into, or exposed for sale in the City of Boston, unless the feathers have been removed from said carcass before the same is brought within the city limits.

HORSE-SHOEING.

BOSTON, February 28, 1901.

Whereas, The Board of Health is of the opinion that walls, hitching-bars, chains and ropes in horse-shoeing shops, to which animals affected by a disease known as glanders have been secured, are liable to become the means of spreading said disease to healthy animals subsequently secured to such walls, hitching-bars, chains and ropes, it is therefore

Ordered, That the walls, hitching-bars, chains, ropes or other apparatus in horse-shoeing shops, to or by which horses may at any time be secured, shall be thoroughly disinfected by the proprietor of such shops, with a 5 per cent. solution of chloride of lime, at the close of each day's business.

INSTRUCTIONS.

The best way to carry out the above regulation is as follows:

First. Fill a 50-gallon barrel with water.

Second. Add 20 lbs. fresh chloride of lime.

Third. Stir thoroughly and *keep tightly covered*.

This mixture will settle out after a short time and leave a clear liquid in the upper part of the barrel.

To use this, take out as much of the clear liquid in wooden pails as may be required at any one time.

First. Dip all chains and ropes used for hitching into a pail full of the clear liquid.

Second. Thoroughly wet down with the clear liquid the entire wall to which horses have been secured, by spraying with an ordinary pump, such as is used for washing windows. (If preferred, a broom may be used instead of a pump, as in applying whitewash.)

CAUTION. — Whenever the clear liquid in the barrel is all used, the sediment should be dumped out and a fresh mixture made. If the liquid is not used up in two weeks, what remains must be poured out, the sediment removed, and a fresh mixture made, because after two weeks it loses strength rapidly.

If a pump is used, a spraying nozzle must be attached; wash out pump thoroughly after each use, and oil with kerosene.

NOTE. — If inconvenient to make the mixture in a 50-gallon barrel, it may be made in smaller quantities, but the mixture must always be of the same strength (not less than 1 lb. of chloride of lime to 2½ gallons of water).

